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SOCIAL SCIENCES

INDUSTRIAL MEDICINE

The Journal of Occupational Diseases and Traumatic Surgery

March, 1942

Industrial Dermatoses
— Diagnostic Procedure in Evaluation —

Medicolegal Testimony
— Present Status —

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— "Railroaders' Disease" —

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— Treatment with a Sulfhydryl Solution —

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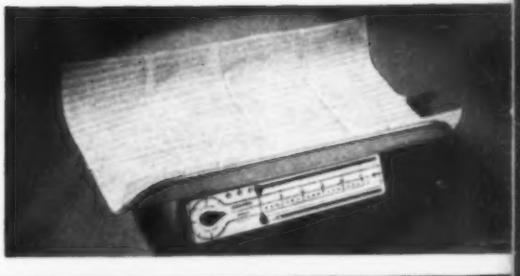

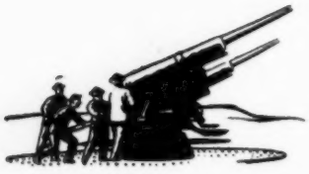

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DR. HAZLETT'S presidency of the A.A.I.P.& S. is being characterized by unusually fine emphasis on the work of the Association's various committees. The full extent of this work will become evident at the Annual Meeting in Cincinnati next month. Meanwhile some indications are apparent in matters that can be published now. One of these is DR. CARL PETERSON'S report on "The Teaching of Industrial Health" (p. 121), the joint work of DR. KRONENBERG'S Committee on Medical Education of the A.A.I.P.& S. and the Council on Industrial Health of the A.M.A. DR. HAZLETT has been keenly interested in industrial medical education for a number of years, and no small part of the credit for the fact that the cause is as well advanced as it is, belongs to him. The problem of education to insure the future supply of industrial medical men has been surveyed, made tangible, and advanced considerably toward effective solution. That is one horn of the present dilemma. The other — the reliance upon the private practitioner to do his part—shows heartening signs of a spontaneous and universal resolution. Witness the quotation, from *Rocky Mountain M.J.*, in the editorial on page 135. . . . THIS issue, however, is not all given over to education—excepting, perhaps, as discussions of the innumerable interesting problems that arise in industrial medicine are educational. In that respect the merits are marked and varied. . . . THE newest A.A.I.P.& S. committee is on the Common Cold. More later. . . .

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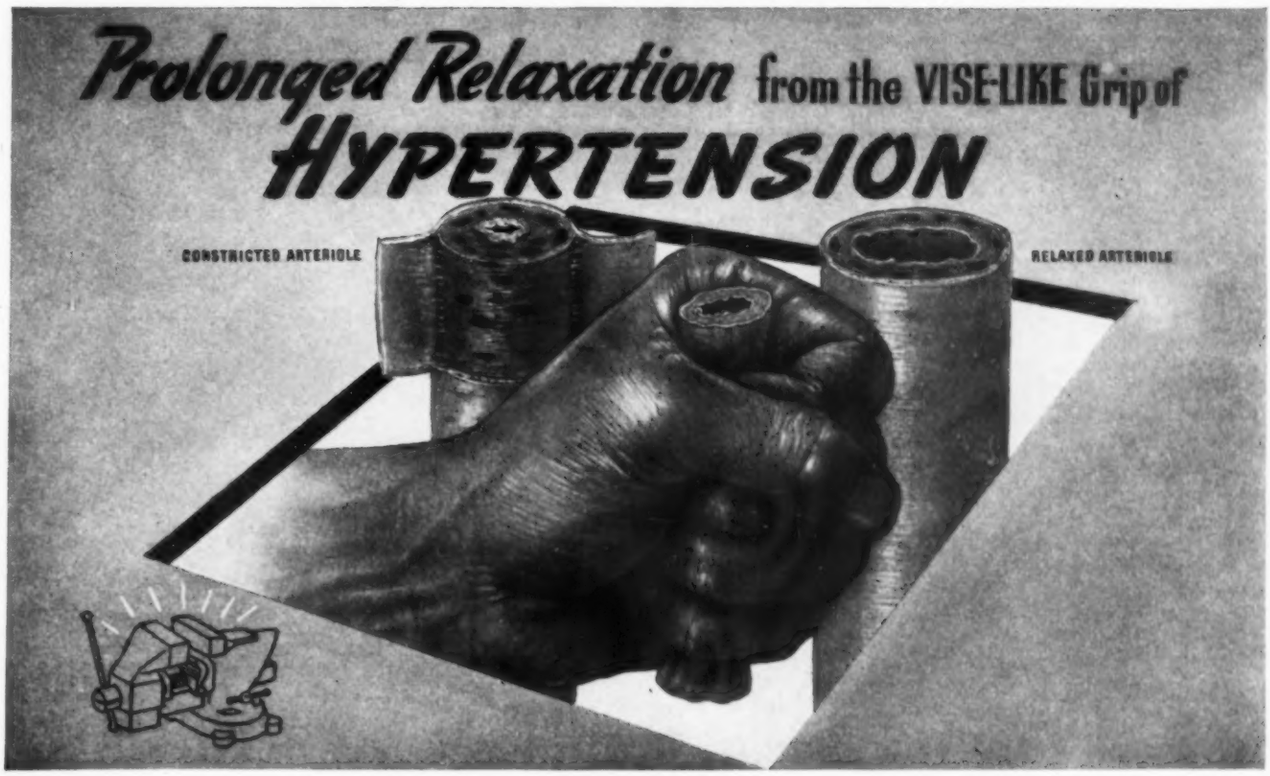

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his article "Nerve and Tendon Injuries of the Hand" was a feature of the February issue.

DR. THEODORE R. VAN DELLEN has succeeded DR. FRED FITZ as Medical Counsellor in *Chicago Tribune's* Welfare Department, DR. FITZ being now MAJOR FITZ in General Hospital Unit No. 12 of Northwestern University.

DR. H. A. HUME, since 1909 associated with the Ann Arbor Railroad as Acting Chief Surgeon, has been appointed Chief Surgeon, succeeding his father, DR. A. M. HUME, who is retiring as Chief Surgeon after 53 years of medical service with the road.

DR. J. R. COCHRAN, of the medical staff of International Harvester, succeeds DR. EUGENE L. WALSH as Assistant Supervisor of Medical Service for that company, DR. WALSH having gone into the Army with General Hospital Unit No. 12 of Northwestern University.

FRANK M. STEAD, B.S., M.S.P.H., Harvard, Chief of the Division of Industrial Hygiene, Los Angeles County Health Department, is giving a course on the principles of industrial hygiene, beginning February 11, under the University of California Extension Division, Los Angeles.

DR. SIDNEY M. MC CURDY, formerly Medical Section Supervisor, State Industrial Commission of Ohio, and now residing in East St. Johnsbury, Vermont, is Medical Director of Civilian Defense for northeastern Vermont. Excepting for 16 months in France as a Captain in the Medical Corps of the Army, DR. MC CURDY has been in

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The Industrial Physicians' Column

The U. S. Public Health Service estimates that 65% of all occupational diseases are industrial dermatoses, causing *20,000* men to lose time from their work every year. The average case costs *ten weeks* loss from the job . . . $100 in compensation . . . and $90 for medical attention!

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Dermatitis acquired at work now costs Industry at least $4,000,000 every year!

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It has been found that the majority of dermatitis cases are caused by substances such common irritants as oil and grease.

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industrial medicine and surgery since 1904, when he began with the Carnegie Steel. He continued there until 1913, and from then until 1932 he was Medical Adviser for Youngstown Sheet & Tube Company. He was one of the founding members of A.A.I.P.& S.

THE Office of Defense Health and Welfare Services (Procurement and Assignment Service) has an Advisory Committee on Industrial Health and Medicine, as follows:

DR. C. D. SELBY, Chairman, Medical Director, General Motors Corporation, Detroit.

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PROFESSOR PHILIP DRINKER, Department of Industrial Hygiene, School of Public Health, Harvard University, 55 Shattuck Street, Boston.

DR. GEORGE M. SMITH, Department of Anatomy, Yale University School of Medicine, New Haven, Connecticut.

DR. WILLIS W. LASHER'S textbook, "Industrial Surgery," published in 1938, by Paul B. Hoeber, has proved so consistently popular, and in such steady demand, that a new enlarged edition has been made ready. Two new chapters are included: Sprains and Strains, and Chemotherapy; and new material has been added to almost every chapter. DR. LASHER is Medical and Surgical Director, Employers Liability Assurance Corporation, New York.

DR. LOUIS W. SPOLYAR, Chief, Bureau of Industrial Hygiene, Indiana State Board of Health, summarizing the Bureau's activities

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** J.A.M.A., 93:1110, Oct. 12, 1929*
Bruckner, Die Biochemie des Tabaks, 1936
*** The Military Surgeon, Vol. 89, No. 1, p. 7, July, 1941*

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for the fiscal year ended June 30, 1941: "The majority of the (Bureau's) recommendations made were carried out. Industry reported spending approximately $100,000.00 in control measures during the year. Thus, for every dollar appropriated for our budget, industry spent $10.00 in carrying out the recommendations."

UNIVERSITY of California Extension Division at Oakland is presenting a course in industrial hygiene for nurses — 15 weeks of two-hour classes, January 22 to April 30. PROFESSOR ROBERT T. LEGGE is the instructor.

GENERAL

THERE were 286,010 claims filed with the Ohio State Industrial Commission during 1941, an increase of 34.9% over 1940, when 212,033 claims were filed. The largest number of claims previously filed in one year was in 1929, when the total was 255,094.

SHARP increases in industry's accidental death toll, direct result of plant expansion and greater defense activity in 1941, are reported by National Safety Council. Eighteen of

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21 industrial states listed increases in such fatalities; in half the increases ranged from 25 to 67%.

QUESTIONNAIRE survey among industrial physicians shows to date, with reference to COLD VACCINES, that 67% of those who replied recommend them; 43% prescribe them; 51% dispense them. As to VITAMINS, 64% prescribe them; 64% recommend them; 25% dispense them. And 80% check into the diets of employees, while 79% recommend protective foods. The aggregate of employees in the situations from which these replies were received is just under 2,000,000.

FOLLOWING is the course of instruction in industrial health being given at the School of Public Health, HENRY F. VAUGHAN, DR. P. H., Dean, University of Michigan, Ann Arbor, February 14 to May 23, 1942. All classes meet at 9:00 A.M. Saturdays at the places indicated.

INTRODUCTORY LECTURES
February 14, 1942—at Ann Arbor.

"The Development of Industrial Hygiene"—K. E. MARKUSON, M.D., Director, Bureau of Industrial Hygiene, Michigan Department of Health.

"The Development of Industrial Medicine"—C. D. SELBY, M.D., Medical Consultant, General Motors Corporation, Detroit.

GENERAL PRINCIPLES AND RELATIONSHIPS
February 21, 1942—at Ann Arbor.

"Purposes, Functions and Problems of Manufacturing"—A. F. LECKLIDER, M.D., Fisher Body Division, General Motors, Detroit.

"The Theory and Practice of Industrial Hygiene"—H. G. DYKTOR, B.Sc., Chief Engineer, Bureau of Industrial Hygiene, Michigan Department of Health.

POLICIES AND PRACTICES IN INDUSTRY
February 28, 1942—at Fisher Body Plant, 23, St. Antoine and Piquette, Detroit.

"Physical Examinations and Placement of Workers, Equipment of Medical Department"—A. L. BROOKS, M.D., Medical Director, Fisher Body, General Motors Corporation.

CONTROL OF HEALTH HAZARDS
March 7, 1942—at Herman Kiefer Hospital, Detroit.

"Organization, Administration, Construction and Equipment of Industrial Hygiene Laboratories"—W. N. WITHERIDGE, M.S., Chief Industrial Hygienist, Bureau of Industrial Hygiene, Detroit Department of Health.

March 14, 1942—at Ann Arbor.

"Temperature, Humidity, Pressure, Noise, etc."—W. G. FREDRICK, Sc.D., Chief Chemist, Bureau of Industrial Hygiene, Detroit Department of Health.

"Fatigue, Monotony, Repetition of Motions, Speeding"—HAYDEN C. NICHOLSON, M.D., Associate Professor of Physiology, Medical School, University of Michigan, Ann Arbor.

CONTROL OF SPECIFIC OCCUPATIONAL DISEASES
March 21, 1942—at Ann Arbor.

"Industrial Dermatitis"—UDO J. WILE, M.D., Professor of Dermatology, Medical School, University of Michigan, Ann Arbor.

March 28, 1942—at Herman Kiefer Hospital, Detroit.

"Silicosis"—C. C. BIRKELO, M.D., Roentgenologist, Herman Kiefer Hospital, and W. L. BROSIUS, M.D., Pathologist, Detroit Board of Health.

April 4, 1942—at Ann Arbor.

"Lead"—S. F. MEEK, M.D., Industrial Hygiene Laboratories, Chrysler Corporation, Detroit, Michigan.

April 11, 1942—at Ann Arbor.

"Other Toxic Metals"—C. W. MUEHLBERGER, State Toxicologist, Michigan Department of Health, Lansing.

April 18, 1942—at Ann Arbor.

"Solvents, Gases, Vapors, Fumes, Mists"—P. B. RASTELLO, M.D., Medical Director, Ternstedt Division, General Motors.

COMPENSATION AND REHABILITATION
April 25, 1942—at Ann Arbor.

"Compensation Laws"—L. J. CAREY, Michigan Mutual Liability Insurance Company.

"Evaluation of Injuries and Rehabilitation"—GROVER PENBERTHY, M.D., Detroit.

May 2, 1942—at Ann Arbor.

"Industrial Injuries to the Extremities"—F. T. MCCORMICK, M.D., Detroit.

"Industrial Eye Injuries"—EMORY W. SINK, Assistant Professor of Industrial Health, University of Michigan.

PREVENTION OF NON-OCCUPATIONAL DISEASES
May 9, 1942—at Ann Arbor.

"Studies of Sickness Absenteeism"—NATHAN SINAI, DR. P.H., Professor of Public Health Economics, School of Public Health, University of Michigan, Ann Arbor.

"Public Health Methods as Applied to Industry"—K. E. MARKUSON, M.D., Director, Bureau of Industrial Hygiene, Michigan Department of Health.

May 16, 1942—at Ann Arbor.

"Seminar and Review"—K. E. MARKUSON, M.D., Director, Bureau of Industrial Hygiene, Michigan Department of Health.

May 23, 1942—at Ann Arbor.

"Examinations."

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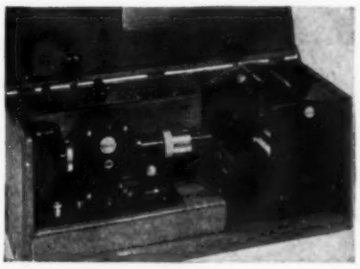

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EDITORIAL, by DR. KENNETH R. FOURCHER, of DR. W. J. DENNO'S staff, in Standard Oil Company's *Medical Bulletin*, February, 1942: "As the lines of the armed forces change, the geographical boundaries of nations are altered from day to day. Many countries have been forced to abandon their usual mode of living and accept unconditionally the terms of the aggressor. The ever-increasing demands of our fighting forces are tremendously affecting all of us in our work and in our daily lives. The rapid expansion of many industrial plants and the new and varied uses to which they are being converted are increasing the accident hazards and our medical responsibilities in many ways. All of the physicians and surgeons connected with industrial organizations are primarily men of medicine who from time immemorial have served uncomplainingly under any and all conditions to the limit of their capacities. This present epoch is just one more in which the doctors' devotion to duty will be accepted as a foregone conclusion. But all of us will have that inner satisfaction of knowing that our part in the attainment of a victorious peace was well done."

INDUSTRY and government working together have trained 2,500,000 skilled workers in the last 12 months. They have commended the training of thousands of women for factory work, and soon will welcome 1,500,000 or more to the ranks of war production. Led by the automobile producers, conversion of industry is going on at a miraculous rate.

—WILLIAM PORTER WITHEROW, National Association of Manufacturers' President, press conference, February 26.

THE proceedings of the Sixth Annual Meeting of INDUSTRIAL HYGIENE FOUNDATION, at Pittsburgh, November 12 and 13, 1941, are now available, in book form, to non-member companies at $2.00 a copy.

UNDER the pressure of events neither employers nor physicians yet fully comprehend how vast a contribution could be made to the war effort by a well organized industrial health program. A reduction of 10% in the 400,000,000 man days now lost annually from illness and injury in industry represents the time required to build five capital ships, 16,000 tanks or 9,000 bombers.

—From "Industrial Medical Mobilization," Editorial, *J.A.M.A.*, February 21, 1942.

PSYCHIATRY, under obligation to check and record all that it finds, is shown to be understandable as well as useful as it follows the differing approaches to "the wish to fall ill" and to other wishes. It is helping the surgeon to see the deeper meanings of pain; it helps the internist to see the interplay of mind and body. To the physician it offers a very practical suggestion —take a little more time to find out about the hopes and fears of your patients.

—From "The Wish to Fall Ill," by EARL D. BOND, M.D., in *J. Tennessee M. A.*, February, 1942.

ADOPTED in November, 1941, by the Eighth National Conference on Labor Legislation, the report of the Committee on Safety and Health Program and National Defense says: "In reviewing again the problem of pre-employment physical examinations, the conference recognizes that any temporary relaxation of physical requirements during the present emergency does not remove the probability of continued and even increasing use of the so-called 'medical control' programs in industry in the post-war period. Because the need for man power in defense industries has given employment opportunities to men and women who would otherwise be idle on account of age or physical impairments, the conference believes this an opportune time to develop factual data and information about the work experience of this group, including data on accident proneness, frequency and severity, on adaptability, regularity, and general desirability from the standpoint of

production. The conference therefore recommends that Congress make available to the U. S. Department of Labor sufficient funds to complete the work of the committee already set up by the Secretary of Labor as a result of a former conference recommendation. Until the study is completed the conference is opposed to pre-employment physical examination unless the employer first has proved to the state that he has installed proper safeguards to protect the employees' health and safety, and unless the state has adopted laws to prevent discrimination against workers resulting from physical examinations."

THIS war must and will produce not only a cleansing of politically corrupt and decadent leaders and groups. It will also advance new concepts for medicine's participation and contribution to a better social order.

—From "Society and Medical Progress," Editorial, *Bulletin Med. Soc. County of Kings*, February, 1942.

A BIOLOGICAL-historical review of malingering leads to the conclusion that malingering is a phenomenon of all life, its objective being a form of self-preservation.

—From *New York Physician.*

MORE than 3,000,000 man-days of work were lost in war industries or war-connected industries from illness during December, and the common cold accounted for one-half of this lost time, a recent institute study found. . . . Reliable statistics regarding the common cold are still rare. Cases of common cold are supposed to out-number any other disease 25 to one. Previous research work in America has shown that every person, on an average, has 3.7 colds a year. There are, of course, many people who catch cold more frequently than this, as surveys in industrial plants show.

—From "Colds and the Gallup Poll," *Medical Record*, February 4, 1942.

FIGURES published by the Ministry of Health show that, through ordinary ill-health in the workers, industry loses some 31½ million weeks' work in the course of a year. While it would be untrue to suggest that conditions in industry are the primary source of this loss, it cannot be doubted that the environmental conditions prevailing during the working day have a marked influence upon the health, both mental and physical, of the working population. The industrial loss resulting from accidents to workers is estimated in terms of money to be over 30 million pounds a year. Accidents do, of course, occur to the healthiest employee, but they are less frequent if the workers are fit and alert and much of the time lost as a result of accidents is saved when the firm's administration includes arrangement for medical supervision. Firms which have introduced a medical service into their organization testify to its value in reducing their sickness and accident rate. One firm, for example, reports the complete disappearance of its particular hazard, lead poisoning, in consequence of the introduction of medical supervision. By comparison with the national average annual loss through illness during peace time of 10 days for men and 12½ for women (which does not include the first three days of illness or any illnesses of less than three days' duration), the records of firms in which medical service is available are most striking. Examples taken before the war from firms employing from 700 to 6,000 workers showed that the days lost per person per annum ranged from 3.75 to 5.25 for men and from 4.5 to 7.9 for women. Figures from a well-known firm relating to the incidence of sepsis showed that on the introduction of a medical service the incidence fell in one year from 3% to approximately 0.5% and at the end of five years it had gradually declined to 0.2%. Such reductions, when stated in terms of human suffering and economic loss, should suffice to establish the claim that some form of medical service is in every way desirable.

—From "The Value of Medical Supervision," in Report of British Medical Association's Committee on Industrial Health in Factories.

A New, Conservative Treatment for Minor Burns

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Designed specifically for the treatment of minor burns, Hughes Solution is cooling and anesthetic, relieving pain and reducing inflammation. Being a hypertonic liquid, it is of value in reducing the extent of bleb formation. Its mild antiseptic action aids in promoting sterility of the affected area. In spray form, it is convenient and comfortable to use, and subsequent dressings may be applied by the patient between examinations, if the physician so directs.

What Hughes Solution does ***not*** do is also important. There is no unnecessary eschar formation or staining—a feature much appreciated by the patient when the face or hands are involved. There is no toxic effect, no tendency to cause sloughing of skin. And there is no problem of removal, no interference with additional treatment when tissue destruction proves more extensive than at first anticipated.

In first aid treatment of major burns in industrial plants, untrained persons frequently use any "burn remedy" which comes to hand, regardless of its suitability. It is therefore highly desirable that the preparation used for minor burns be suitable also in a serious emergency.

Hughes Solution, used as a first-aid treatment in such cases, gives prompt relief from pain, and promotes asepsis. As a spray, it discourages handling or rubbing of the wound, with the attendant danger of contamination and further injury. There is no danger of toxic absorption, and the physician's treatment is not affected or complicated by eschars or residues.

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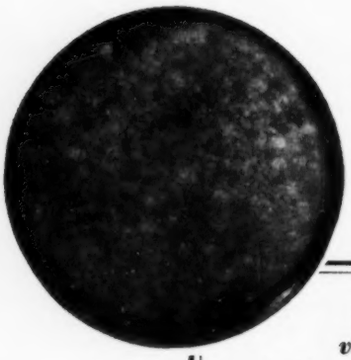

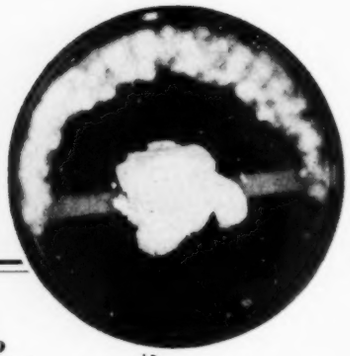

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ELIMINATION of health hazards in speeded-up defense industries is the objective of an industrial health committee set up by the San Francisco County Medical Society. Medical problems of individual plants are to be studied, and cooperation in solving them will be given by the committee without charge. Where special engineering procedures or investigations are found advisable, the committee will recommend competent experts and assist in organizing medical departments. Inquiry blanks are being sent to industrial heads, and labor unions are being asked for suggestions.

ITEM from the Seventy-Eighth annual midwinter meeting, Chicago Dental Society: "According to DR. WILLA YRETSKY, of Grand Rapids, gingivitis and trench mouth can be caused by diet inadequacy which results from bad habits in eating. This situation can be corrected only by education. It exists now because of indolence on the part of all those persons who should be correcting it. The dentist thinks it the duty of the physician and the physician feels he should interfere only when the patient is ill. He isn't likely to see him when he is well. They both leave it to the nutritionist and the educator ignores it, except for a brief chapter in hygiene books."

AS IN the first World War period, the Bureau of Mines notes an alarming occurrence in occupational mercurial poisoning at mines and retorting plants, due largely to expanded production for explosives and other war materials. Several cases have been reported from mercury mines of the west; in one instance 14 men were severely affected. The main source of mercury is cinnabar. Poisoning may develop in mining from handling ore that contains free mercury, from dust and fumes that escape during retorting the ore and condensing the vapor, and from the handling of liquid mercury. In addition to workers in mines and processing plants, other possible victims of mercurial poisoning include physicists, chemists,

physicians, dentists, and natural science teachers. Mercury enters the body chiefly by inhalation of dust and vapor and by swallowing as with food, although dust can enter through the skin. Characteristic symptoms are inflammation of the mouth, psychic irritability and muscular tremor, with subsequent varying effects.

MEETINGS

MICHIGAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS is having its Annual Meeting, April 1, 1942, Durant Hotel, Flint, Michigan, with the following program arranged by the Program Committee, DR. GEORGE J. CURRY, Flint, Chairman, and DR. CAREY P. MC CORD and DR. A. H. WHITTAKER, Detroit.

MORNING Session:
"What's Going on in Industrial Medicine"—HENRY H. KESSLER, M.D., F.A.C.S., Newark, New Jersey, presiding:
"Industrial Medicolegal Services"—A. H. WHITTAKER, M.D., Detroit.
"The Official Agencies Available in Michigan for Industrial Hygiene Guidance"—KENNETH E. MARKUSON, M.D., Director, Bureau of Industrial Hygiene, Michigan Department of Health, Lansing.
"Relationship between the Industrial Physician and the General Medical Profession"—HAROLD H. GAY, M.D., Medical Director, Dow Chemical Company, Midland.
"Industrial Toxicology"—C. W. MUEHLBERGER, PH.D., Toxicologist, Michigan Department of Health, Lansing.
"Absenteeism in Industry"—MAX BURNELL, M.D., Surgeon, A-C Spark Plug Company, Flint.

AFTERNOON Session:
"Burns"—GROVER C. PENBERTHY, M.D., Associate Clinical Professor of Surgery, Wayne University College of Medicine.
"Wound Healing"—JOHN B. HARTZELL, M.D., Assistant Professor of Clinical Surgery, Wayne University College of Medicine.
"Use of Sulphanilamide in Wounds"—CAPT. N. K. JENSEN, M.C., U. S. Army, Camp Crowder, Missouri.
"Osteogenesis and Osteoporosis"—JACKSON LIVESAY, M.D., Assistant Roentgenologist, St. Joseph Hospital, Flint.

ANNUAL Banquet:
"The Operative Treatment of Fractures"—CLAY RAY MURRAY, M.D., Associate Professor of Surgery, Columbia University College of Physicians and Surgeons.

WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS (A.A.I.P.& S. component) will hold its Annual Meeting at Del Monte, California, on May 3, 1942, the day preceding the meeting of the State Medical Association.

MANUFACTURERS

A NEW Pressure and Tourniquet Point Chart just issued shows the main arterial circulation (red) indicating the digital pressure and tourniquet points on the background of a clearly defined skeleton. The subject matter conforms to that now widely used in civilian defense first aid courses. Industrial firms may use the chart to post near bulletin boards. It is 18 in. wide and 54 in. high, two-thirds life size, printed on cloth-backed paper with wood rollers top and bottom; supplied in a cardboard mailing tube. Inquire of Clay-Adams Company, 44 East 23rd Street, New York.

DR. FREDERICK EBERSON has been appointed Medical and Research Director, National Drug Company, Philadelphia. Ph.D. Columbia 1918, M.B. and M.D. University of Minnesota 1924, DR. EBERSON has a distinguished record in medicine and research. He has been connected with the Manchurian Plague Prevention Service in China; with Rockefeller Institute; Mayo Clinic; and the Medical School of the University of California as assistant professor, 1926-1933. From 1934 to 1938 he was Epidemiologist in the Bureau of Communicable Diseases, Department of Public Health, San Francisco; and 1938 to 1941 Pathologist and Chief of Laboratory Service, U.S.V.A. Facility; and Pathologist and Director of Laboratories, Gallinger Hospital, Washington, D. C. He has published many articles and monographs in the fields of medical research, epidemiology, immunology, and infectious diseases; is the author of a recent book, "The Microbe's Challenge."

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by

JOHN D. ELLIS, M.D.

Senior Surgeon, St. Luke's Hospital
Chicago, Illinois

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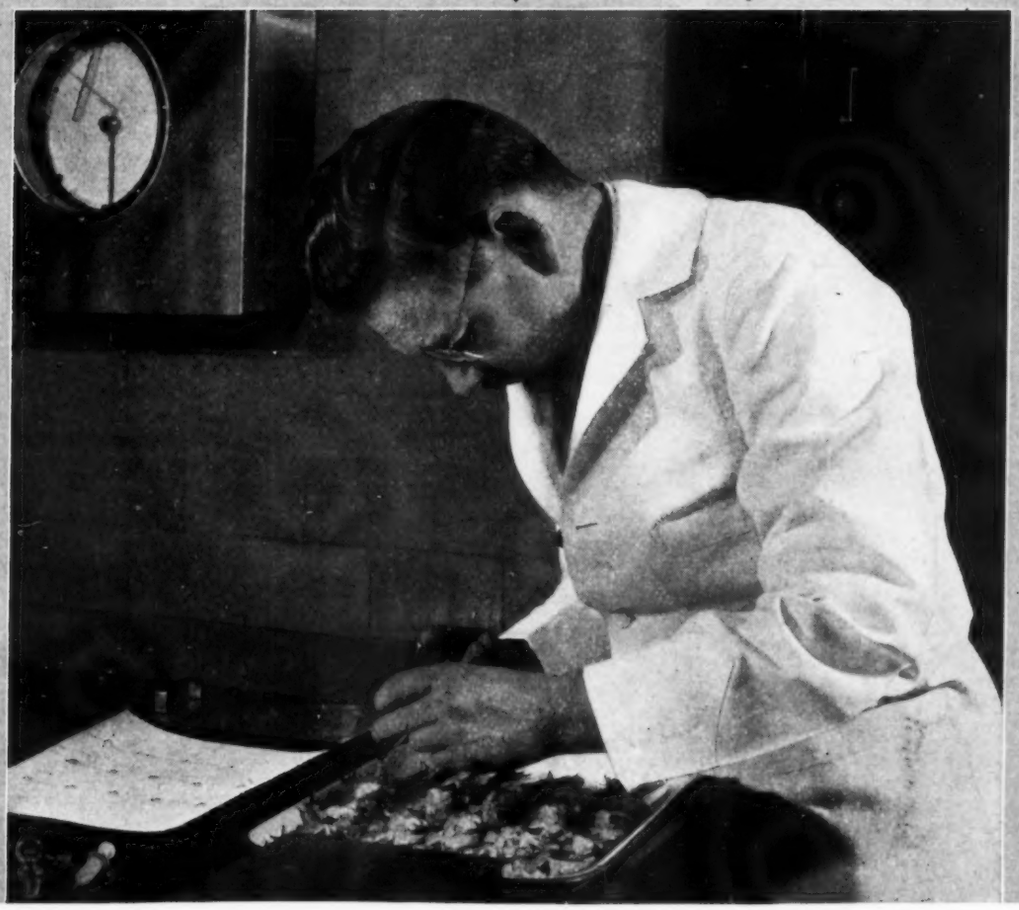

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Industrial Medicine

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The Journal of Occupational Diseases and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 11 March, 1942 Number 3

Diagnostic Procedure in Evaluating Industrial Dermatoses

LOUIS TULIPAN, M.D.,
New York
and
FREDERICK A. GLASS, M.D.,
Baltimore

THE experience gained from our observation and evaluation of at least 10,000 cases, many followed up over a period of years and some encountered in industrial courts, forms the basis for the following contribution. The science of industrial diseases of the skin is still adolescent and the knowledge we have acquired in the past 15 years has been largely through trial, error and the application of the fundamental principles common to all the by-paths of medicine. Probably no other single factor has contributed more to this growth than the introduction of the principle of the patch test. But, in the light of present day principles of allergy and the experience of nearly everyone in this field, the patch test must not be regarded as an unconditional aid in diagnosis; in fact, its misinterpretation may lead to confusion.

Under these conditions as is true with most other problems in medicine, good clinical judgment and a generous sprinkling of the common sense in which our forebears were so rich are the most useful and dependable aids for solving the sometimes unpredictable problems in this field.

Much has been written, and, even more regularly, new opinions and ideas are appearing in a steadily growing literature on this subject; but there can be no doubt that the subject remains unsettled. The lack of universally recognized rules for procedure and criteria is frequently bemoaned by lay and medicolegal experts sharing the responsibility in making decisions. For only as recently as 1940, has the Council on Industrial Health of the American Medical Association joined with the committees of the American Dermatological Association and the A.M.A. Section on Dermatology and Syphilology, in an effort to establish definitions and criteria for diagnosis in occupational skin diseases. Certainly the creation of many new industries, the acceleration in activity of industries producing for war, and the countless hazards they create bear out the need for standardization and simplification.

The following definitions and tabulations for procedure represent what we believe to be a logical sequence of steps and considerations to follow in ascertaining whether a given case is of occupational origin. It is offered as a simple blue-print which may guide one in an investigation so that no really essential consideration in the history or physical examination need be neglected. We also include a systematic outline of technique for conducting patch tests, the salient features influencing their interpretations, and the listing of groups and concentrations of some of the more frequently encountered irritants. While we make no claims for its completeness, it is felt that it incorporates most of the ideas and suggestions which have appeared in recent literature as well as our own experience.

Foerster said, "To the conservative minded, the joker in the compensation laws appears to be the definition of a compensable injury." This statement applies as well to a compensable disease. The need for a definition which is at once clear, broad and liberal has been met in some, but not all, of the states. It should be apparent that clarity is necessary so that the law may be easily comprehended; broadness, so that its provisions may be inclusive; and liberalness, so that the worker need not suffer because a technical deficiency denies him a right to just compensation. Such a law, if it is to provide adequately for occupational dermatoses, could be defined as follows:

DEFINITION: An occupational dermatosis is any disease of the skin arising out of, during, or in the course of a person's work.

It will be noted that this definition is broad; it avoids the use of the word "injury" which would require that the dermatoses be established as to exact time, place and manner of onset. Nor does it list only those diseases considered compensable or limit only those substances which may cause an occupational dermatosis.

In this definition it is necessary only for a worker to show that his occupation was directly or indirectly causally related to the eruption with which he is suffering. Since the establishment of the latter requires competent dermatologic examination, the following procedure in evaluating causal relationship is offered as an aid to the industrial dermatologist:

I. HISTORY:
A. Past History—
1. Has the patient had any previous eruption?
2. Duration.
3. Type of treatment.
4. Did it clear up entirely? When?
5. Was it considered occupational?
B. Present History—
1. In what type of work does the patient engage?
2. How long is the patient doing this work?
3. When did the present eruption begin?
(a) Was any eruption present when the patient started this work?
(b) Did the patient stop work? When?
(c) Period between starting *present* occupation and onset of the eruption.
(d) Did the eruption improve or get worse after refraining from contact with the usual ingredients encountered?
(e) Did the eruption reappear upon resuming work?
4. What materials or chemicals does the patient handle?
5. What therapy was administered—by patient? By physician?
6. To what does the patient trace eruption?
7. Is such an eruption existent among the patient's fellow-workers?
8. Does the patient engage in other work outside of his or her regular occupation?
(a) Habits at home.
(b) Dishwashing, gardening, painting.
(c) Hobbies.

II. PHYSICAL EXAMINATION:
1. Examine the patient from head to foot (including toes, toe webs, and
(a) Note birthmarks, scars, nails, congenital defects, xeroderma, etc.).
(b) Are cold, heat, perspiration predisposing factors?
2. Examine mouth.
3. Describe the eruption or lesions thoroughly and location.
(a) Is the condition generalized or localized?
(b) Is it limited to the exposed surfaces? (Observation may account for a contact dermatitis from exposure to a spray or powder.)
(c) Is eruption present on areas usually covered by clothing? (Observation may account for dermatitis due to penetration of irritants.)
(d) Are lesions grouped or diffuse?
(e) Is there an acute inflammatory base?
(f) Does the eruption conform with the clinical picture of a "mycid," "bacterid," or "chemid"?
4. Have the patient demonstrate his daily work routine.
(a) Note parts exposed to friction and those contacting chemicals.
(b) Such observations may account for localized patches of dermatitis and their arrangement.

TECHNIQUE, PRECAUTIONS AND INTERPRETATIONS OF PATCH TESTS

A. Technique—

1. Place a small (one-inch square) piece of gauze, saturated with the substance to be tested, on normal skin, cover with oiled silk or cellophane and seal by covering it completely with a broad strip of adhesive. Label in ink the name of the substance and date and hour applied.

2. Permit the patch to be in contact for from 24 to 48 hours.

3. It is suggested that when doubt exists whether the substance to be tested is an essential or primary irritant, a temporary patch test be performed, observing the patient for from one-half to one hour for evidence of intense sensitization. If such is lacking, the patch may be replaced and left on for the usual interval (24-48 hours).

B. Precautions—

1. If the eruption is very acute or generalized, wait until it subsides before performing a patch test.

2. Employ only the recommended concentrations of substances appearing in authoritative lists.

3. If the patient is known to have pronounced skin sensitivity, use only the most dilute concentration as a control.

4. If the patient feels a burning sensation, he should be instructed to remove the patch test at once.

5. A patch test may exaggerate an existing eruption ("flare-up") or precipitate a generalized erythroderma accompanied by constitutional symptoms of toxicity. (Such a phenomenon fortunately is very rare.)

C. Interpretations—

1. Patch tests, when positive, indicate that the patient is sensitive to a concentration of a substance at the skin site tested, that will not produce any reaction in a normal skin. A positive reaction may manifest itself either by erythema, vesiculation, formation of bullae, or ulceration.

2. "False Positive." An underlying vasomotor irritability, may produce erythema due to pressure and friction (as is seen with dermographism produced by stroking) or prominence of follicles resembling "goose skin" due to pilomotor irritability.

3. The reaction depends on the mildness or height of sensitivity of the individual, the strength of the suspected agent, and the length of time the agent is allowed to remain on the skin.

4. A positive patch test with an irritant to which an existing eruption is presumed to be due, should reproduce the initial features of that eruption.

5. A delayed positive reaction is one occurring several days following the removal of a patch and, according to two schools of thought, is due either to an increase in the threshold of sensitivity at the site, or to an acquired sensitivity from the substance itself.

6. A patient may show a positive reaction and still be able to continue contact with the responsible allergen.

7. Negative tests may mean:
(a) The skin site tested is no longer sensitive.
(b) Local differences in sensitivity.
(c) Working conditions not reproduced.
(d) Patient tampered with patch.

RECOMMENDED CONCENTRATIONS OF SUBSTANCES FOR PATCH TESTING.

The following list is not presented as a complete one. It represents an attempt to group similar substances in an organized manner so that it may serve as an efficient and ready reference. More complete lists may be found in the references noted at the end.

1. ACIDS

Moisten gauze with a 1% aqueous solution, except

Hydrofluoric—moisten gauze with a 0.2% aqueous solution.

Boric—moisten gauze with a pure powder.

Other acids may be employed in higher concentrations; see complete lists.

2. ALKALIS

Moisten gauze with a 0.5 to 1.0% aqueous solution, except

Calcium hydrate—moisten gauze with a 0.125% aqueous solution.

Some alkalis may be employed in higher concentrations; see complete lists.

3. SOAPS

Moisten gauze with suds in concentrations actually employed in work; except

Tincture green soap—moisten gauze with 5% solution in petrolatum or 2.5% alcoholic solution.

[NOTE: always perform controls, especially for soaps containing antiseptics and perfumes.]

4. SOLVENTS

Moisten gauze with a 50% solution in a bland oil (olive oil).

5. PETROLATUM PRODUCTS AND DERIVATIVES

Moisten gauze with the pure substance, except

Crude coal tar—moisten gauze with a 5-10% solution in petrolatum.

Petroleum—moisten gauze with a 20% solution.

Benzene, Gasoline, Kerosene, Machine oil—moisten gauze with a 50% solution in olive oil.

6. INSECTICIDES
Moisten gauze with a 25% solution in olive oil, except
Larvex, Creosote } —moisten gauze with a 10% solution in olive oil.
7. DYES
Aniline, Cosmetic, Hair, Fur } —moisten gauze with perspiration and pure substances, powder or paste, except
Shoe—moisten gauze with a 50% solution in olive oil. Controls!
8. DYE INTERMEDIATES—moisten gauze with perspiration and pure powder, except
Beta naphthol—moisten gauze with 10% solution in olive oil.
Michler's hydrol—moisten gauze with 5% alcoholic solution.
Nitroso-dimethyl aniline—moisten gauze with 1% alcoholic solution.
Dinitro chlor benzol—moisten gauze with 0.5% alcoholic solution.
9. RUBBER AND RUBBER PRODUCTS
Latex, Balata, Gutta siac } —moisten gauze with perspiration and pure substance.
10. RUBBER ACCELERATORS
Moisten gauze with perspiration and pure substance, except
Para-amido phenol—moisten gauze with 3% aqueous solution or 10% solution in olive oil.
Pyrogallol—moisten gauze with 3% aqueous solution or 10% solution in olive oil.
Para-nitroso-di-methylalinine—moisten gauze with 1% acetone solution.
11. RUBBER ANTI-OXIDANTS
Moisten gauze with perspiration and pure substance.
12. PAINTS
Lacquers, Enamels, Varnishes, Shellac } —paint on gauze, allow to dry, then moisten with perspiration, except . . .
House paint—moisten gauze with 50% solution in olive oil.
Linseed oil, White lead, Water and mineral colors, Calcimine, plaster, Inks and blueing } —Apply on gauze in full strength.
Resins—moisten gauze with perspiration and pure substance.
[NOTE: Always perform controls with paints or paint ingredients.]
13. WAXES
Apply on gauze in full strength, except
Floor wax—moisten gauze with 50% solution in olive oil. Controls!
14. OILS
Almond, barley, cod-fish, cod-liver, cottonseed, citronella, cocoanut, glycerine, hempseed, linseed, mineral oil, olive, palm, peanut, pine, poppy seed, walnut, sulfonated lanolin, lard, lubricating.
USE FULL STRENGTH. For exceptions, in which lower concentrations are indicated, see complete lists.
15. ESSENTIAL OILS
Moisten gauze with 5-10% solution in oil, except
Oil of orange—moisten gauze with 1% alcoholic solution.
Perfume oils—moisten gauze with 1% alcoholic solution.
Flavoring oils—moisten gauze with 2% alcoholic solution.
Always perform controls.
16. PLANTS AND WOODS
Use pure, powdered or finely divided. Perform controls.
17. PHOTOGRAPHIC DEVELOPERS
Moisten gauze with a 5% aqueous solution, except
Paraphenyl endiamine—moisten gauze with 2% solution in petrolatum.
Para-amido phenol—moisten gauze with 2% solution in petrolatum.
Pyrogallol—moisten gauze with 3% aqueous solution.
Potassium bichromate — moisten gauze with 0.5-1% aqueous solution.
Sodium bichromate — moisten gauze with 3% aqueous solution.
18. CLOTHING AND CLOTHING MATERIALS
Moisten with perspiration; leave on for five days.
19. DRUGS
Apply in concentration of suspected exposure; if powder, moisten gauze with perspiration. Controls.
20. COSMETICS
If powder, moisten gauze with perspiration. Controls.
Antihidrotics—if powder, moisten gauze with perspiration.
21. FOODS
Use full strength except rinds of some fruits, spices, mustards, etc.
22. FERTILIZERS
Use full strength; always perform controls.
23. POLISHES
Use full strength, except
Shoe—moisten gauze with 60% solution in petrolatum. Always perform controls.
Brass—moisten gauze with 10% aqueous solution. Always perform controls.
Furniture—moisten gauze with 10% solution in olive oil. Always perform controls.
24. ANTISEPTICS
Iodine tincture—DO NOT COVER!
Metaphen—moisten gauze with 0.5% alcoholic solution.
Mercury bichloride—moisten gauze with 0.1% aqueous solution.
Lysol—moisten gauze with 1% aqueous solution.
Zonite—moisten gauze with 1% aqueous solution.
Thymol—moisten gauze with 1% solution in petrolatum.
Cresol—moisten gauze with 0.5-1% aqueous solution.
Creosote—moisten gauze with 10% solution in olive oil.
Formaldehyde—moisten gauze with 5% aqueous solution.
"C-N"—moisten gauze with 1-10% aqueous solution.
25. CLEANING FLUIDS
Non-inflammable—use full strength.
Inflammable—moisten gauze with a 60% solution in olive oil.
Always perform controls!
26. CEMENT AND SLAKED LIME
Use in concentrations employed at work. Always perform controls!
27. ADDITIONAL SUBSTANCES encountered in household contacts.
Alum—moisten gauze with a 10% aqueous solution.
Ammonia—moisten gauze with a 1-2% aqueous solution.
Camphor—moisten gauze with perspiration and pure powder.
Oil of camphor—moisten gauze with 10% solution in petrolatum.
28. FORMULA FOR ARTIFICIAL PERSPIRATION

Sodium chloride	3
Sodium sulphate	1
Urea	2
Lactic acid	2
Olein	2
Stearin	2
Aq. dist. q.s.	1000

To make acid, add a drop or two of acetic acid.
To make alkaline, add a drop or two of ammonia.

SUMMARY: (1) The need for universally recognized definitions and criteria for diagnosis of occupational diseases of the skin has been re-emphasized.

2. The diagnosis of a causally related dermatosis requires not alone the judicious performance and conservative interpretation of patch tests, but likewise careful history taking and a thorough dermatological examination.

3. In the history, emphasis should be placed on whether improvement of the eruption occurred on

cessation of exposure and exacerbation occurred on resumption of exposure.

4. When an inquiry into occupational exposures, processes and irritants throws no light on the cause, consideration should be given to household and avocational exposures.

5. A physical examination should include examination of the skin over the entire body if the presence of a constitutional (non-occupational) disease of the skin is to be excluded.

6. Certain other dermatoses, such as "mycids," "chemids," or "bacterids" may be mistaken for those of occupational origin and should be considered with care.

7. When there are features of a dermatitis venenata, contact with powders, liquid sprays or gasses is to be considered, whether it involves exposed parts only (face, neck, hands) or includes parts covered by clothing saturated or penetrated by an irritant.

8. The patient's own demonstration of the manner in which he uses his hands in his work will frequently explain an irreconcilable or bizarre eruption and establish its relationship to occupation.

9. The technique, including precautions, for conducting patch tests was given. Their interpretations must take into account the possibilities of "false positive," "delayed" and "false negative" reactions. At best, patch tests can only serve to correlate clinical findings and to guide one in reaching conclusions; they are not to be regarded as the basis of a diagnosis.

10. A list of groups and accepted concentrations for patch testing with some of the more commonly used irritant substances was given.

11. A careful evaluation and impartial opinion as to causal relationship in any case should regard all the preceding principles.

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The Status of Medicolegal Testimony

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FEW tasks are as abhorrent to the physician as that of giving medical testimony in a legal controversy. He rightly envisions the traditional medical degenerate who hovers like a buzzard within the confines of the courtroom, waiting to swoop down upon the witness stand to testify for a price. In years past the service of the ethical physician was rarely demanded in matters of litigation. Today the changing complexion of medicine frequently necessitates his presence in court, due largely to the recent inclusion of the occupational diseases within the meaning of the Workmen's Compensation Act in most of our states. Since the hazards of occupation are increasing, and since the diseases of communal origin may be confused with the occupational disabilities, the gamut of possible claims is unlimited and unpredictable. Each case of this type which goes to contention before the Industrial Accident Commission requires a medical opinion before a decision is reached.

These cases which require medical testimony may be broadly divided into three groups:

First, the claim of direct trauma, such as fracture, burns, or laceration of tendons or nerves, wherein the occupational origin of the disability is not denied, but the extent of the disability is questioned. Usually such physical disabilities are measured according to standards adopted by the state and offer no great problem. However, when objective signs of injury are absent, such as in the average head injury, then the alleged disability must be differentiated from hysteria, neurosis, and malingering. Head, back, and allied types of injury require an evaluation of the severity of injury, findings at the time of injury, the chain of events following the injury, as well as a consideration of the possible motivation, i. e., the psychological, sociological, or compensation factors. Volitional factors must be differentiated from the organic. This calls for the finest clinical experience, as well as training in the fields of psychology and neurology.

The second group which concerns us is that in which the claimant may have been exposed to an industrial hazard, such as lead, silica, benzol, carbon tetrachloride, mercury, cadmium, hydrogen, sulphide, and the like, or to certain skin irritants. To diagnose an illness resulting from an exposure to these noxious substances requires a knowledge of the toxic properties of the allegedly offending agent, its toxic threshold, the process or method in which it was used, the preventive measures employed or ignored, the length of exposure, degree of concentration, the accepted signs and symptoms, and the laboratory tests. It is in this type of case that the inexperienced physician frequently fails to "go the whole way" in his investigation. Space forbids enlargement of this point.

The third group involves the speculative relationship between an alleged trauma and some subsequent disease. This group differs from the one just discussed in that there are usually absent any laboratory findings or tests to aid in accepting or denying the claim. Coronary thrombosis is an excellent example of the speculative type of case claiming compensation and alleging a cardiac condition as the result of occupational effort or injury. While there can be ample evidence produced that the claimant has a coronary thrombosis or that the decedent died from such a cause, there is no acceptable uniform yardstick to measure the relationship of his alleged effort to his cardiac condition. Traumatic appendicitis, ruptured gastric ulcer, cancer following a single trauma, hemorrhoids, epididymo-orchitis, pneumonia, and tuberculosis are only a few of the diseases which fall into this speculative group. In this type of case the designing lawyer browbeats and coerces the inexperienced physician into admitting "probable" or "possible" occupational responsibility, when actually under less confusing circumstances this same physician would be unwilling to admit even a remote pos-

sibility. It is here that the industrial physician with his larger experience, gained from a series of cases of a like nature, and his knowledge of the accepted postulates, renders a more equitable opinion.

In compensation litigation, medical testimony is derived from two sources, the claimant's physician, who is usually his family physician, and from the defendant's doctor, who practices industrial medicine, or is a specialist in a chosen field. Since the claimant appears usually not more than once in his life before the commission, his physician is apt to be an infrequent witness in such a court. But the defendant's witness, because of his experience in this type of medicine, may appear many times. It has, therefore, been intimated sometimes by his fellow physicians, or by a referee, or a workman, that the defendant medical witness is the prejudiced hireling of the insurance carrier or employer. This unwarranted insinuation is based upon fallacious assumption and ignorance of the actual facts, as will be subsequently revealed.

ACTUALLY, it is the claimant's physician who is most apt to be prejudiced for certain obvious and understandable reasons. As a family physician he is the unselfish product of a glorious medical heritage whose humanitarianism overshadows his decision, whose charitableness offsets his reasoning. Possessing the honorable qualities which throughout the ages have typified the Great Physician, he is not a doctor only, but a constant adviser and valued friend to those with whom his routine practice brings him in contact. As Osler remarked, "His worst faults often partake of his best qualities." Truly, altruism and charitableness are among his best qualities, but these should not be substituted for logical deduction or scientific facts which are the essence of equitable medicolegal testimony.

On the other hand, the trained industrial physician is rarely prejudiced in his estimation of an industrial claim. This is not a blind, opinionated statement, but rather one which can be supported by statistics obtained from several sources. Inspection of the files of any compensation insurance company reveals that the very physicians upon whom they depend for medicolegal testimony are also the same doctors who diagnose and treat the majority of their cases that claim an industrial injury or an occupational disease. Further examination of these reports will disclose an astonishing revelation, doubtless to the astonishment of the skeptic, that these same physicians consider not just the majority of these cases as compensable but rather the greater percentage of them. Since a great percentage of these cases are concluded to be of occupational origin they are never contested and fail to reach the Industrial Accident Commission for review, and hence the obvious fairness of the industrial physician is not fully realized.

Further support to the contention that the industrial physicians renders an equitable decision in compensation cases is found in the statistics annually released by the State Compensation Insurance Fund of California. These figures are comparable to those of privately owned companies in this and other states. During the year 1936 they accepted upon the medical reports of their physicians and without litigation, 96.6% of all claims made upon them, thereby rejecting only 3.4%. In 1937 the rejections were 3.3%; in 1938, 2.8%; in 1939, 2.5%, and in 1940, 2.2%.

During the past five years in a clinic devoted entirely to industrial medicine and surgery, and from which this paper emanates, there was an admission of 55,780 patients. Following an evaluation of the occupational history, the clinical picture, the laboratory findings, and frequently a visit to the plant or place of employment to study the alleged hazard, approximately 3.2% of this large number were adjudged as having a non-compensable disability. Furthermore, nearly 80% of this 3.2% were cases of hernia or backache. This small percentage of rejections becomes more significant when it is pointed out that many of the patients were referred to this clinic by other physicians because the compensability of the claim was questioned by them.

Early in this article it was stated that in certain circles the medical witness for the insurance carrier was held in disrepute because he *supposedly* appeared in their defense *too frequently*. That this implication is grossly erroneous can now be proved by analysis of the preceding statistics.

Admitting, as one must, that 2 to 3% rejections constitute but a small fraction of the total number of cases dealt with and comparing the large number of compensation cases seen by the industrial physician with the small number seen by the non-industrial physician, it then becomes apparent that it is the claimant's physician who actually appears more frequently before the Industrial Accident Commission. The experience of the writer furnishes a concrete example. During the year 1940 he examined approximately 1,800 industrial patients and considered the compensability of each case. Yet during that same year he testified before the industrial referee only 17 times, or .009%. Supposing a non-industrial physician, one not commonly engaged in doing "insurance work" saw as many as even 50 compensation cases in a year and appeared only once before the Commission in that year, his percentage is 2%. Surely such figures and facts cannot indict the industrial physician, or the physician for the insurance carrier, as prejudiced.

A CONSIDERATION of the nature of the claims under workmen's compensation as previously grouped explains why an insurance carrier depends upon the knowledge of a relatively few physicians. If the contention in any given case involved only a knowledge of the common communal diseases, then the medical witness could be chosen from the practice at large. But since the medicolegal problem is to differentiate the occupational from the non-occupational ills, experience and knowledge are demanded. What percentage of the profession can satisfactorily meet such a demand? An astonishingly small number, as revealed by the survey of the Council on Industrial Health of the American Medical Association.* In analyzing this survey, Sappington states, "In a questionnaire sent out by the American Medical Association, to which 120,000 physicians replied, only 1,283 could be recorded as competent in industrial medicine." By spreading this small number over 48 states the limited supply of experienced industrial physicians to meet an increasing demand, especially during the war emergency, is not only striking but lamentable, as pointed out in an editorial of the journal just mentioned.

CONCLUSION: The statistics and evidence as presented here disprove any contention that, as a whole, the physician for the insurance carrier is prejudiced in Workmen's Compensation claims for disability, but rather that he renders an equitable decision in favor of the claimant in 98% of the cases he examines. They reveal that in consideration of the large number of industrial cases he deals with each year, he appears before the Industrial Accident Commission comparatively few times, thus dispelling any insinuation that he is

*J.A.M.A., March 29, 1941.

comparable to the "professional" medical witness of the common courts. Finally, from the analysis of the survey by the American Medical Association, it is apparent why the insurance carrier is limited in the choice of a medical witness in any given community when the medicolegal problem involves an opinion regarding the industrial origin of the claim.

Peptic Ulcer

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A DISCUSSION of peptic ulcer is appropriate because its morbidity is high, the economic loss is immense, the treatment is lackadaisical, the recurrences are many, and it is especially prevalent among railroaders. In fact it might well be called a railroaders' disease.

In the Santa Fe Hospital in Topeka the last 18 months we have treated as in-patients 2785 persons. Of these 64 had duodenal ulcers, nine had gastric ulcer, 33 had nervous dyspepsia—106 in all (approximately 4%).

Only cases are included in the ulcer category in whom the roentgenologist uncovered a filling defect either in the duodenum or stomach, as the case might be. In the nervous dyspepsia list are included those afflicted with this syndrome in whom x-ray revealed neither a gastric nor duodenal defect nor malfunction of the gall-bladder nor other organic disease of the gastro-intestinal tract. This ailment has various other cognomens; mucous colitis, spastic colitis, and irritable colon are rather common. I am including the nervous dyspepsia cases because I think they are parts of the same entity. The fact that the x-ray man did not discover a filling defect in the stomach or duodenum is not positive evidence that such was not present at the time of examination; neither is it proof that such did not exist last week; nor is it proof that it will not be present next week.

ETIOLOGICALLY there are two theories regarding the cause of peptic ulcers: (1) that it is strictly a local lesion, and (2) that it is a manifestation of a constitutional disease, to which the local phenomena, ulcer and/or hyperacidity, are secondary. Much experimental evidence supports the theory of the central causation, chiefly the frequency of ulcers complicating cerebral lesions and the frequency of ulcers following vagal and sympathetic disturbances. To me the clinical evidence is convincing that peptic ulcers are psychogenic in origin.

I believe peptic ulcer is a disease of stress and maladjustment, a tension disease, liable to afflict persons with a congenital susceptible diathesis. The high incidence among railroaders is easily explained. During the last 10 years, what with the depression and the reorganization of the roads, with the consequent reduction in forces and other economies, the lots of the men have been difficult. Stresses and strains and tempers have sifted down through the ranks, even to the Mexicans on the section. Especially trying has been the lot of the minor executives, the head clerks, the straw bosses, all of whom have had to carry heavy loads under that intolerable condition, responsibility without authority.

There are the maladjustments on the jobs—square pegs in round holes, men doing desk work who should be switching, men doing supervisory work for which they are temperamentally unfitted and men doing routine work who are possible executives. Among our cases was one poor fellow in charge of a roomful of typists. Two or three of these females knew exactly how to get this man's goat. To cure his ulcer he had to take a demotion and go back to routine desk work.

There are the domestic problems, too—debts, and difficulties in balancing the budget. Is the man's home a refuge of peace and comfort, or is there maladjustment there. Does he start to work in the morning with a song in his heart, or with his ears pinned back by the vehemence of a nagging wife? Are there troublesome children? Or forgotten psychic insults to be uncovered by psychoanalysis? All these go into the etiology of peptic ulcer.

IN THE average handling of these cases the routine is about as follows: The patient tells the doctor of his dyspepsia—gas, belching, sour stomach, epigastric distress, relieved by food or alkali. Pain, food, comfort—this triad is the sequence. A gastro-intestinal x-ray is ordered. If the roentgenologist reports a filling defect in the duodenum or stomach the diagnosis is ulcer. "Yes," the doctor says, "You have ulcer. I will put you on a diet and Sippy powders." He hands the patient a printed diet and a prescription for alkali. This is not good medicine. You may relieve for a time your patient's bellyache but you are not treating his ulcer.

Under no circumstances do I prescribe these stereotyped diets. Go over the average list. First they forbid any meat except baked white meat of chicken or baked fish. Since when is there any difference between the light meat and the dark meat of a chicken? What harm can come from a broiled steak or a slice of tender roast beef. Only cooked cereals are allowed—I presume to prevent the harshness of the uncooked cereal from coming in contact with the ulcer area. These cereals are always taken with milk; they cannot reach the ulcer in any other condition than a mushy mass. I mention these to show you the inconsistencies of the ordinary dietary regime. Of course your ulcer patient cannot get away with corn on the cob, or pork chops and fried potatoes. Pancakes are generally taboo on these diets, but the only thing wrong with a well-cooked pancake is the excessive amount of syrup in which it is generally served.

I give my patients an ample, well-balanced diet, taking care that there shall be variety, and no lack of vitamins, and enough calories for the job on hand. Generally a glass of milk or a sandwich or even a glass of water will take care of the mid-morning or mid-afternoon distress. And the same at bedtime, if there is nocturnal distress.

AFTER the history and x-ray examination have either confirmed or denied your suspicion that you are dealing with an ulcer, the most important part of your examination is yet to come. When I have time and assurance that I will not be interrupted I take this patient to my office to talk things over. I encourage him to tell me his story, to talk about anything that comes into his head, just asking enough questions to keep the narrative within bounds. I try to get him to tell me his background, family and personal. I get his reaction to the job, to his immediate superior, and to things in general. I find out all I can concerning his family and his family life. This will take several interviews, and all the time I am more and more guiding the inquisition to episodes which I suspect to be the key to the psychological quirks that are the ultimate cause of his ulcer, and dyspepsia. I find it bet-

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ter not to take immediate notes and to guard myself against interruption. These men are skittish and gun-shy until they get their stories off their chests; some trifle may stop the flow of their confessions.

In most of these cases the ordinary practitioner will have no trouble uncovering the mental conflict at the root of the disease. In others an expert psychiatrist may be needed.

AND now you ask, "What are you going to do for your patient?" Explain to him frankly the cause of his ulcer or dyspepsia. Be simple, and do not bore him with your verbosity. Do not go into burdensome detail. By this time you should have sized up your man and sensed the best approach to him. Some you must weep with; some you must pray with; some you must cuss. Theirs is an emotional problem. You must stimulate in some way a counteracting emotion. And you will often be surprised at the results. For instance, one of my patients who had an ulcer of many years' standing finally convinced me that for 25 years he had been the victim of a dominating mother-in-law and wife combination. The father had been a preacher and the mother-in-law had run his church and almost the whole conference. I began to hedge and finally said to him, "I feel that it is rather late to do anything about your situation. If 25 years ago you had gone home drunk some night and kicked both your wife and your mother-in-law out the door you wouldn't have your ulcer today." He leaned back in his chair and let go a fine belly laugh. Next day he asked for his release; said he was going back to Texas to sit at the head of his own table for a change. I have not seen him since, but he writes me that he has no ulcer now.

THERE are no more snap jobs on the railroads. One can not interfere in any way with the discipline of the organization. But often a whisper to an understanding official—and we have such men on the Santa Fe—will do wonders. From such a source a friendly greeting, a pat on the back or a tactful interview will often change a man's whole outlook on his life and his job. But the help from this source is limited; seniority rules and other items in labor contracts often make it impossible for officials to shift men to jobs for which they are better fitted.

Medically, sedation is absolutely necessary. The tension must be taken from the hypertension, and by hypertension I do not mean high blood pressure. My favorite prescription is bromide and belladonna, and if there is a habit constipation I add some cascara. Of belladonna I prescribe a full adult dose, at least 15 to 20 drops to the dose. Occasionally the belladonna does not seem to hit the spot and I switch to hyocyamus, also in full adult dosage. If the patient is one of those unfortunates who has well dieted I add some vitamin, generally the B complex.

This treatment will take care of from 80% to 90% of your cases. And in the 10-20% balance you have the intractable cases and those with various complications. First, the hemorrhages. Too often to be just a coincidence a massive hemorrhage is the first symptom of an ulcer. Especially is this true in the robust middle-aged patient. These should be handled like any other bleeding. Rest, morphine, vitamin K in one form or another; and, again I say; Give them something to eat and keep away from alkalis. In the aged arteriosclerotic cases of hemorrhea the outcome is on the lap of the gods.

The intractable cases—the chronic dyspeptic, that unfortunate below par male or female—are born with poor protoplasm. They haven't got what it takes. On them you find the scars of former battles with the surgeons—appendectomies, gastro-enterostomies, salpingectomies, oophorectomies, adhesions. But not nearly as many as formerly. Your tact, your skill, and your patience alike will be tried. You will hear much of diets, alkalis, gastric lavage, colonic lavage; they must have been in the hands of one cultist after another. A proper entrance-to-service examination should eliminate most of these. But they do get by. And they burden the medical service and the efficiency of their various departments. Once on the railroad payroll there is no way of eliminating them. Gross inefficiency cannot be used as an excuse for dismissal or demotion. My best advice on these is to hand them over to the younger house physicians as they come to you from their internships and residencies.

If a gastric ulcer does not heal in three to five months surgery must be considered, on account of the habit of gastric ulcers undergoing malignant degeneration. In duodenal ulcer operation is indicated in the presence of obstruction or of gross deformity at the site of the ulcer. But regularly I see apparent obstruction relax under the treatment outlined above, namely, psychotherapy, rest, sedation and improved nutrition.

I am not qualified to discuss the exact surgical procedure to be employed—except to say that I do not think that gastro-enterostomy is the discredited operation that one would suspect from the literature coming out of some of the clinics. Gastric resection operation with a mortality of from 4 to 6% should not be routine. Let the master surgeons go ahead with this operation but let us wait for 10 years for the reports to come in from the hinterlands before we add gastric resection to our surgical "musts."

CONCLUSION. Peptic ulcer is a constitutional disease of psychogenic origin. The local manifestations, ulcer and hyperacidity, are important and significant. Treatment directed solely toward correcting these secondary manifestations is ineffectual. The major therapeutic effort should be psychiatric. And as a rule the general practitioner is psychiatrist enough to handle the situation. This position is not new or original with me. For decades voices have been crying in the wilderness, but still the standard treatment is starvation and alkalis.

The Rapid Polarographic Estimation of Lead in Urine

—*I. Entrainment Method*—

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THE polarographic method[1] has been applied to the estimation of lead in blood[2, 3] and tissues.[4, 5] In the following paper its adaptation to the rapid routine determination of lead in urine will be described.*

Urinary lead may be obtained in inorganic solution for polarographic analysis (I) by ashing of the urine sample, (II) by ashing and dithizone extraction, and (III) by precipitation of lead by entrainment and subsequent ashing. The ashing of the whole urine sample is not advisable, because the remaining ash is not soluble in weak acids, such as might be used directly

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From the Foundation for Dental Research of the Chicago College of Dental Surgery, the Cook County Coroner's Laboratory, the Department of Pharmacology, University of Illinois, College of Medicine. Presented before the Division of Biological Chemistry of the American Chemical Society at Atlantic City, New Jersey, September, 1941.

* A polarographic method for the determination of lead in urine with preliminary electrolytic separation was published after the conclusion of the present work by K. BAMBACH and J. CHOLAK in *Ind. and Eng. Chem., Anal. Ed.*, 13:583, 1941.

for polarographic analysis. Also, the high and varying concentration of iron in urine[6] (80 to 1630 γ/L) interferes with polarographic analysis. Application of polarographic analysis following dithizone extraction of lead from the ash will be reported in a second paper.

The present paper deals with the entrainment method for urinary lead which was first suggested by Fairhall.[7] The lead may be entrained as lead phosphate during precipitation of urinary phosphates of the alkaline earths. Application of polarographic analysis to this method was suggested by Cranston[8] who dissolved the phosphate precipitate in hydrochloric and tartaric acid and used this solution directly for polarographic analysis. The authors found many urines in which organic substances were carried down with the precipitate, and interfered with the accuracy of polarographic analysis. If, however, the precipitate is ashed the lead phosphate becomes very insoluble[9] and cannot be dissolved quantitatively in weak acids without further operations.

Lead may also be entrained in a precipitate of calcium oxalate, obtained by the addition of soluble calcium and oxalate salts to the acid urine.[10] The calcium oxalate precipitate is not as bulky as the phosphate precipitate. If ashed at 500° C the oxalate is converted into calcium carbonate and oxide, which are easily soluble in 20% citric acid. This acid has been found to be an excellent indifferent electrolyte for polarographic analysis of lead.

The entrainment of lead in a precipitate of calcium oxalate has been used in connection with the colorimetric dithizone procedure by Rose and Lucas[11] and others. They found that lead which had been added to urine as an inorganic salt could be recovered quantitatively in the precipitate. Polarographic analysis confirmed that from 0.5 to 10 γ of lead which were added as lead nitrate to 10 ml of urine could be recovered quantitatively (Table I). Recently the objection was raised that lead may be excreted as a lead complex or an organic compound.[12] This organic lead may or may not be entrained in the precipitate. This question was decided in the following way:

From seven persons with lead poisoning (from 300 to 800 γ Pb/L) 10 ml. of urine were analyzed by the polarographic oxalate entrainment method. Another 10 ml. of the same urines were ashed with nitric acid, dissolved in conc. hydrochloric acid, partially neutralized, and made up to 10 ml. This solution of inorganic urine salts was then submitted to the oxalate entrainment method. The results of the two samples agreed within the limits of error in all cases (Table II).

TABLE I.
RECOVERY OF INORGANIC LEAD FROM URINE

γ Lead added to 10 ml. of urine as $PbNO_3$.	γ Lead found in 10 ml. of urine with polarographic oxalate entrainment method.
0	0.3
0.5	0.7
1	1.35
3	3.1
5	5.2
7	7.6
10	9.6

TABLE II.
RECOVERY OF TOTAL LEAD FROM URINE OF LEAD POISONED PERSONS

Sample	γ Lead found in 10 ml. of urine with polarographic oxalate entrainment method.	γ Lead found in 10 ml. of inorganic urine with polarographic oxalate entrainment method.*
1	3	3.2
2	3.75	4.05
3	5.6	5.5
4	6.3	6.8
5	6.5	6.7
6	7.15	7.45
7	8.05	8.5

*after subtraction of blank—0.5 γ

Method

REAGENTS: (a) 20% citric acid. Dissolve 200 g. of citric acid, C.P., low in lead, in one litre of redistilled water. Add one crystal of thymol.

(b) 5% calcium chloride. Dissolve 5 g. of $CaCl_2.H_2O$, reagent, in 100 ml. of distilled water in a separatory funnel. Add four drops of concentrated ammonia. Extract the lead with 25 ml. portions of chloroform-dithizone (40 mg/L) until the color of the green dithizone remains unchanged. Add eight drops of glacial acetic acid (d). Discard chloroform-dithizone and wash three times with chloroform.

(c) 30% potassium oxalate. Dissolve 30 g. of $K_2C_2O_4.H_2O$, reagent, in 100 ml. of distilled water. Add 5 ml. of calcium chloride solution (b). Let stand for one hour. Remove precipitate by centrifuging.

(d) Glacial acetic acid, reagent.

The preparation of the dithizone chloroform solution and the cleaning of glassware have been reported by one of us (V.A.G.[13]).

Procedure

PIPETTE 10 ml. of fresh urine into a 15 ml. Pyrex centrifuge tube. Add two drops of glacial acetic acid (d). Add 1 ml. of the potassium oxalate solution (c)

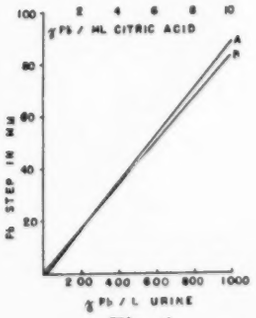

Fig. 1.

Fig. 2.

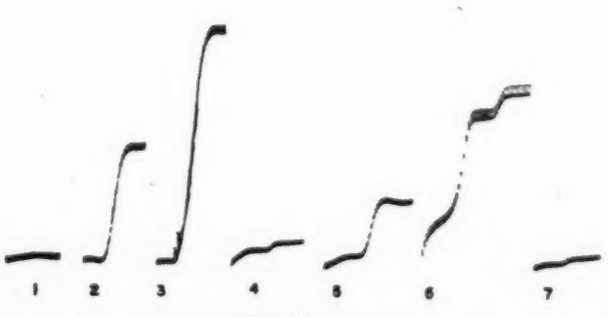

Fig. 3.

FIG. 1. Pb. Calibration Curve. (A) Preliminary calibration. (B) Final calibration.
FIG. 2. 5 γ Pb/ml in Citric Acid. Curve 1: Uncompensated. Curve 2: Overcompensated. Curve 3: Correctly compensated.
FIG. 3. Lead Curves of Urine Samples. Curve 1: 20% citric acid. Curve starts at 0.3 V.
Curve 2: 5 γ Pb/ml in citric acid (from 0.3 V.). Curve 3: 10 γ Pb/ml in citric acid (from 0.3 V.).
Curve 4: Normal urine in procedure (from 0.3 V.). Curve 5: Pathological urine (from 0.3 V.).
Curve 6: Pathological urine. 1st step—Bi. 2nd step—Pb. (from 0.1 V.).
Curve 7: Commercial dist. water in procedure (from 0.3 V.).

and let stand for five minutes. Add 1 ml. of calcium chloride solution (b). Cover tube with rubber cap, shake, and let stand for two hours. Centrifuge for 10 minutes at 3000 r.p.m. and discard supernatant liquid. Dry the precipitate in the centrifuge tube at 120°C for one hour. Transfer the dry cake to a 4 ml. porcelain crucible by inverting the centrifuge tube. Ash in muffle furnace at 500°C for 45 minutes. Allow to cool. Add exactly 1 ml. of citric acid solution (a). Cover crucible with watch glass and wait until dissolved (15 minutes). Transfer to a Heyrovsky micro-electrolytic cell (this transfer need not be quantitative) and free solution from oxygen with hydrogen or nitrogen. Polarograph with maximum galvanometer sensitivity (not less than $4x10^{-9}$A./mm/m) at an applied voltage of from 0.3 to 0.7 V. Measure height of lead step and read concentration of lead in urine from calibration curve* (Fig. 1).

Calibration Curve

A PRELIMINARY calibration curve is obtained by polarographic analysis of separate 1 ml. portions of the 20% citric acid containing from 0.5 to 10 γ of lead. The polarographic curve of 5 γ Pb/ml is shown in Fig. 2, curve 1. The part of the curve preceding and following the lead step is sloped due to the residual current at high galvanometer sensitivities. The accuracy of the measurement of the step may be increased by applying the current compensation method of Ilkovic and Semerano.[14, 1] Curves 2 and 3 show overcompensated and correctly compensated curves of the same solution.

For the final calibration curve the ashed precipitates of reagent blank tests must be obtained. The ash is added to separate 1 ml. portions of citric acid containing from 0.5 to 10 γ of lead (as lead nitrate). It will be found that the lead step is smaller in the final calibration because of the change in the indifferent electrolyte (Fig. 1).

Reagent Blanks

IF THE reagents are properly purified there will be no reagent blank. However, if 10 ml. of commercial distilled water is used for the blank test there might be a blank due to the lead content of the distilled water. In this case the following procedure is followed: The distilled water is analyzed as above, but the supernatant liquid obtained after centrifuging is not discarded. This solution is treated again with 1 ml. each of the oxalate and the calcium solution and the precipitate is analyzed as above. This second precipitate will show the true reagent blank if any. The difference between the first and the second precipitate will show the lead content of the distilled water. A distilled water blank should not be subtracted from the result of the urine analysis as no distilled water is used in the procedure.

The accuracy of the oxalate entrainment method in connection with polarographic analysis is ± 10 γ/L in urines with less than 100 γ Pb/L and ± 10% for higher lead concentrations. "Normal" urines showed from 30 to 50 γ Pb/L with this method. Fig. 3 shows polarographic curves of calibration tests (curve 1-3), the curve of a "normal" and a pathological urine, and the curve for commercial distilled water which contained 20 γ Pb/L. The presence of bismuth does not interfere with polarographic analysis of lead in urine (curve 6). The method is suitable for the routine estimation of lead in urine because of the small size of the sample, the small number of reagents and glass vessels used, and the small number of operations involved.

* The Model XI Heyrovsky Polarograph, courtesy E. H. SARGENT & Co., Chicago, was used for analysis.

Summary

A METHOD for the rapid routine estimation of lead in urine is described. The lead is precipitated by the oxalate entrainment method. The precipitate is ashed, dissolved in citric acid, and polarographed. The accuracy of the method is ± 10%.

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The Treatment of Face and Eye Burns

—With a Sulfhydryl Solution—

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BURN injuries about the face and particularly those involving burns in and around the eyes, present problems requiring special treatment. So serious is this problem that Willems and Kuhn[1] presenting a statistical study of 1206 burn cases state that loss of vision is regarded as the greatest risk that the industrial patient runs when he gets burned. In this rather comprehensive report six different treatments are listed as having been used in the eyes but none of the six would likely be regarded as of particular value in treating burns per se.

Because of this situation the uniformly satisfactory results obtained from a new treatment noted in a series of 43 cases presented herewith, are believed well worth reporting. Particularly so because of the successful clinical report with the same treatment by Pierce.[2] His cases were in the general field of burn injuries and were noteworthy in that prompt healing occurred, with a minimum of scarring and without infection. The treatment consisted of a sulphur solution* that is an important source of sulfhydryl compounds.

These —SH chemical linkages are the active components of glutathione, a compound of great nutritional importance found in almost all human tissues.

A New, Economical Source of Sulfhydryl

THE scientific background for the use of this solution in burns has been developed by researches conducted in the Institute of Pathology at The Western Pennsylvania Hospital in Pittsburgh, which is under the directorship of Dr. Ralph R. Mellon.[3a]

It was several years ago that Dr. Mellon and his associates discovered that the solution was a rich source of sulfhydryl and it was on this ground that they explored its practicability, first in ordinary sunburn and later in ultraviolet burns produced in the laboratory. As a result of their studies they concluded that the solution was deserving of a thorough clinical trial in thermal burns.[3b]

*Hydrosulphosol, developed by Earl Hill Wilson, of Los Angeles, California.

Fig. 1.

Fig. 2.

Fig. 3.

FIG. 1—Lye burns, Case No. 1, 48 hours after treatment and after swelling of face and tongue had been reduced. FIG. 2—Same, 10 days after treatment and after most of eschar formations had separated. FIG. 3—Same, three weeks after treatment, completely healed

Case Reports

CASE NO. 1: P.G., male, age 48. The contents of a quart jar containing three cans of commercial lye which showed on a pathological laboratory analysis to be stronger than a 40% solution, was hurled into the face by a convict at the Arizona State Penitentiary. The solution entered the nose, mouth, ears and both eyes, as well as inflicting burns on the neck. The anterior two-thirds of the tongue, which was burned, was treated by spraying with full strength Hydrosulphosol every three or four hours. Additional local treatment consisted of spraying the burned areas every one or two hours with one part of Hydrosulphosol to one part sterile distilled water, for the first 24 hours; later increasing interval between treatments. A dilution of 4 cc. of Hydrosulphosol to one ounce of sterile distilled water was used as drops in both eyes every two or three hours.

As the accident occurred at Florence, Arizona, about 90 minutes elapsed before the patient could be transported to the Good Samaritan Hospital at Phoenix, Arizona, and Hydrosulphosol therapy instituted. Emergency treatment at the penitentiary consisted of washing the affected areas with a weak acetic acid.

The corrosive action of the lye had caused a destruction of some of the bulbar and lid conjunctiva, also clouding of the cornea of the right eye. The lids, conjunctiva and cornea of the left eye also were burned by the caustic.

General treatment was directed toward combating shock, control of pain, maintenance of fluid balance, etc.

By the end of 10 days the eschar had separated without requiring surgical aid. Injured tissue was fully repaired except for small areas around the eyelids and mouth. Further and final treatment to these areas consisted of application of Hydrosulphosol ointment for another 10 days in the nose, corners of the mouth and eyelids.

From a subnormal temperature of 97°, a short peak of 102.6° was recorded the first day with an abrupt drop to normal during the first 24 hours. During the next five days the temperature varied from 99° to 101°, after which it remained approximately normal.

A blood study made during the first 24 hours showed reds, 5,430,000; whites, 19,400; hemoglobin, 15.5 gms./100 %; polys, 90%; lymphs, 9%.

Urinalysis showed specific gravity of 1.033, occasional white cells, no blood, occasional epithelial cells, and no casts. Later urinalysis showed no changes.

Blood studies showed a gradual return to normal with a report on the eighth day showing reds, 4,690,000; whites, 12,500; hemoglobin, 14.5 gm./97%; polys, 77%; lymphs, 22%.

On the 18th day, reds were 4,610,000; whites, 9,500; hemoglobin, 13.5 gm/88%; polys, 69%; lymphs, 30%; RBC non-filament, 10%.

CASE NO. 2: J. N., male (Mexican), age 27. Steam burns in and about the eyes, neck, body and arms. Treatment started at 2:00 P.M., July 10, 1941. Patient discharged 2:00 P.M., July 18, 1941, completely healed. In severe pain when admitted to hospital. Pain completely eased after first application of Hydrosulphosol spray, one part Hydrosulphosol to one part sterile distilled water. Blood study showed reds, 4,560,000; whites, 10,500; hemo-

Fig. 4.

Fig. 5.

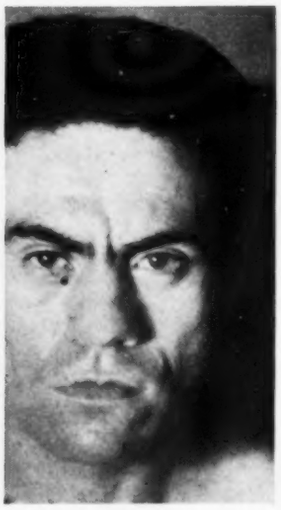

Fig. 6.

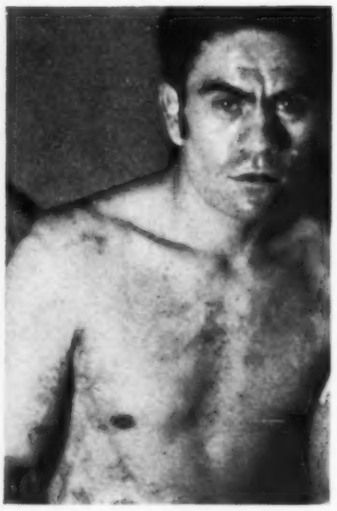

Fig. 7.

FIGS. 4 and 5—Steam burns, Case No. 2, body and face 24 hours after treament, without carrying out extensive debridement. FIGS. 6 and 7—Same, eight days after treatment of steam burns started

globin, 13.5 gm./87%; polys, 83%; lymphs, 15%. Urinalysis normal. Recovery was so rapid no further blood or other tests were made.

Maximum temperature first 24 hours, 101.6° for short peak. Temperature dropped abruptly to 99°, went to 100° on second day, and then dropped to normal, remaining approximately normal during remainder of recovery period.

Hydrosulphosol drops, 4 cc. Hydrosulphosol to one ounce of sterile distilled water, every two to three hours during waking periods. Hydrosulphosol spray every two to three hours first four days. Eschar began to separate on fourth day. Final eschar separation on eighth day without surgical aid.

CASE NO. 3: L.M.A. Male, age 14. Injured in same accident as Case No. 2. Marked steam burn of right cornea and conjunctiva; steam burns of right arm and right leg, and right side of front of body. By the eighth day all the burns were healed with the exception of the central portion of the right cornea. First application of Hydrosulphosol spray relieved pain from severe body burns. Hydrosulphosol drops (4 cc. to one ounce sterile distilled water) were used in the eye every two or three hours, gradually increasing interval between treatments. Pupil was also atropinized and dark glasses used to protect eye from light. No infection of the eye occurred. Patient did complain of pain due to pulling of the lid over the rough cornea and was given medicine to relieve this pain. Cornea gradually healed but drops were not discontinued until he had had three week's treatment. Healing was without scarring. Patient's vision with glasses is 20/20 each eye. Blood study at start of treatment showed no deviation from normal.

THE severity of the three cases described required their hospitalization. Of the remaining 40 cases, 38 were treated by Dr. Richard L. Penn, Avondale, Arizona, in consultation with the writer. While the injuries in these cases were not severe, all involved burns to the face and in the eyes sustained while handling chemically prepared fibre conduit at the Litchfield Airport, Litchfield Park, Arizona. The offending chemical was creosote.

All of these burns received fairly prompt treatment and emphasize the fact that, if Hydrosulphosol can be applied early in the course of a burn, it promptly relieves the pain and initiates rapid healing. Some of these cases were treated only once, others were treated once daily for two days, while some required daily treatment for three or four days. All cleared up satisfactorily, and without infection. Incidentally, the group included whites, negroes, and Mexicans.

Aside from the time required to transport these injury cases a short distance in trucks and the time required for application of the treatment, none of these workers lost any time from work. In these cases wet compresses saturated with Hydrosulphosol were applied over the injured areas.

Two other unusual eye injury cases were handled by Dr. M. G. Wright, Winslow, Arizona, also in consultation with the author. One of these had serious potentialities as the result of fresh plaster being thrown directly into one eye causing severe pain and swelling. After treatment it was possible to remove in one piece a deposit of the plaster after it had accumulated in a thin layer between the inside of the eyelid and the eyeball. Treatment in this case consisted of drops every four hours prepared by adding 4 cc. of Hydrosulphosol to one fluid ounce of sterile distilled water, plus occasional wet compresses saturated with full strength Hydrosulphosol placed over the outside of the eye. Recovery was complete in about one week, with only two days lost time.

The other case reported by Dr. Wright involved painful injury and marked swelling in the area of both eyes following exposure to the heat and the glare of an acetylene torch, which was used for several hours without the protection normally provided by goggles designed for this purpose. Recovery in this case was complete in three days with treatment consisting of dilute Hydrosulphosol drops in the eyes every four hours during the day and two or three wet compresses saturated with Hydrosulphosol full strength.

Method of Application

IN the cases reported here the Hydrosulphosol was applied as a spray with best results being obtained by diluting the solution on the basis of one part Hydrosulphosol to one part of slightly warm, sterile distilled water. The solution is then sprayed on all burned areas with an ordinary hard-rubber bulb syringe avoiding use of syringes with metal parts.

Consultation with other doctors using the Hydrosulphosol therapy indicates general acceptance of spray applications as the method of choice in serious burn injuries or old cases. There appears to be some variation of time intervals employed between applications. These spray applications have been made as often as every 15 minutes for the first six hours and then tapered off.

A satisfactory eschar can be established quickly and the maintenance of a thin, pliable eschar can be controlled by tapering off of spray applications as healing progresses. There is evidence of an ability to favorably influence healing processes by continuing application of the spray treatment until recovery is complete. The eschar established by the Hydrosulphosol spray separates without surgical aid in from seven to 10 days.

In treating burns in the eyes 4 cc. Hydrosulphosol to one fluid ounce of sterile distilled water was used as drops. This same strength solution was used in wet compresses over the eyes when indicated.

Discussion

AS the report from Dr. Mellon's laboratory significantly points out, a primary requisite in any burn treatment is the exclusion of oxygen. In the past this has been done mechanically, chiefly by the use of greases or somewhat more effectively by paraffin sprays. By virtue of its strong reducing powers, sulfhydryl compounds thwart oxygen effects by chemical means. Moreover, the probability that the -SH solution is absorbed into the tissues would make this neutralization of oxygen more than a free surface effect.

That sulfhydryl solutions will stimulate growth of tissues, particularly epithelial ones, is well known from the earlier studies of Reimann and his associates.[4] Unfortunately however, it was found necessary to link the unstable -SH linkages to creosol and to dissolve the resulting compounds in 70% alcohol. As a result, the clinical results left much to be desired.

The other components of the Hydrosulphosol solution, chiefly thiosulphates and a small amount of penth thionates in aqueous solution, give no evidence of being deleterious; nor is the rather highly alkaline pH of 10, because on dilution it quickly reaches levels consonant with tissue function. Thus it would appear that in this solution we have the first cheap source of sulfhydryl in adequate concentration[5] and in a form so non-toxic that it is practicable to use in such delicate structures as the eye. Its ability to stimulate epithelial tissues makes it specially applicable to burns involving the cornea.

While this product possesses the characteristic odor of the -SH compounds, the actual application presents a number of desirable features. It does not stain bed clothing or even dressings, is easily applied, and based on all studies made to date appears to be entirely safe to use about the eyes, ears, nose and mouth.

The economic advantages appear to lie in the ability to hasten healing, thus decreasing hospital and medical

expense, not to mention saving in time lost. By reducing or eliminating scar tissue patients are spared permanent disfigurement which often cannot be corrected even with plastic surgery. In this connection it might be noted that other workers have reported a value in employing sulfhydryl applications after skin grafting.

Particular attention is called to Case No. 1, because the injury was inflicted when a strong lye solution was hurled into the face with the destructive caustic entering both eyes. The right side of the face received the full force of the solution with the result that the initial injury to the right eye was so severe it had to be removed. Vision of the left eye, however, was saved virtually unimpaired.

Recovery from the actual burn injury was effected in less than three weeks, but one of the happy results noted in this case, which was entirely unexpected, was entire freedom from scarring except around the right eye. This same lack of scarring or recovery without serious scarring, was noted in the other cases. Apparently there has not been any adequate therapy available for the treatment of severe caustic burns, but informal reports from others indicate that results comparable to those referred to in Case No. 1 have been obtained with the use of Hydrosulphosol. It is also to be noted that this patient showed signs usually indicative of burn shock, namely, an initial subnormal temperature followed by a 20% concentration of the red cells. Other determinations in this direction were not made.

Summary

FORTY-THREE cases of burns involving injury to the eyes and other parts of the face have been successfully treated with an aqueous solution of sulfhydrl (Hydrosulphosol).

The outstanding advantages of this solution are: (1) The prompt alleviation of pain; (2) the formation of a flexible eschar which detaches spontaneously when healing is complete; (3) a minimum of scarring and contractures; (4) the prevention of infection; (5) complete lack of toxicity; (6) ease of application without the necessity for extensive debridement, together with the fact that the solution is relatively inexpensive; and finally, (7) a rapidity of healing vastly more prompt than any other burn treatments used by us.

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Periodic Physical Examinations

—In Terms of Results—

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D. B. ARMSTRONG has stated: "The periodic health examination is, potentially at least, the keystone of modern preventive medicine, and the nucleus around which more important personal hygiene matters are likely to be developed"; and further, that according to actuaries, several hundred thousand insurance policyholders taking periodic health examinations showed an 18% better mortality than the unexamined group of legitimately comparable policyholders.[1]

In 1922 the American Medical Association interested itself in the question of periodic physical examinations for the individual, as a means of prevention—the discovery and care of incipient disease, and directing and protecting the individual's health; and gave the idea their official endorsement. Considerable study and effort have been expended in promoting the movement, but for various reasons the program has received little acceptance so far as the average physician and individual is concerned. As recently as 1940, the A.M.A. published a second rather completely revised manual on the subject.

Some insurance companies provide free periodic health examinations for certain policyholders, but, on recent questioning, it was estimated that probably not over 6% of those so entitled avail themselves of this privilege.

For years some managements of industries have been cognizant of the health problems of their employees; and many large and special industries have adopted a program of pre-employment and periodic health examinations as a means of eliminating the unfit and insuring the health and efficiency of their workers, and of protecting them from the possible hazards of their employment. This effort has been given impetus by government, by the A.M.A. through the Council on Industrial Health, the American College of Surgeons, special groups of physicians and allied scientists, insurance companies, and industry itself. It has become an accepted principle that periodic physical examination of employees in industry is one important step in the use of good industrial medicine.

Quoting from the U. S. Public Health Reports of August 23, 1940: "In view of the increasing social consciousness of government, as evidenced by Federal and state laws in recent years, the trend and principal features of workmen's compensation laws are of especial interest. This is true not only with respect to medical care, compensation during the period of disability, and death benefits . . . *but* . . . the recognized responsibility of industry for injuries sustained by employees in the course of their employment, regardless of the question of negligence, is a stimulation to industry to make adequate provision for the health and protection of employees. In addition to the exclusion of the principle involving negligence, in the application of the workmen's compensation acts, another important protective feature, an advance made since the first of these compensation laws was passed, is the inclusion of occupational diseases as compensable conditions."

Social legislation in the form of industrial accident and disease compensation laws is likely to prove expensive for the unprepared. It did not take long for safety engineers to find that one of the prime requisites for safe industry was a sane and healthy worker, and that faulty health was frequently the cause of costly accidents. Several states have applied the theory that a worker should be physically fit, to protect his fellow workers as well as himself from the hazards of his occupation, and have provided for pre-employment and periodic examinations in their laws.

The practice of safety is nothing new to the medical men who have been associated with the railroad industry for the past 20 or more years, but the steady improvement in the safety record of railroads shows that the continuous application of sound principles will produce satisfactory results.

Reginald Fitz[4] has discussed the periodic health examination as a useful method of clinical investigation, to aid in our knowledge of the cause and early

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development of chronic diseases whose etiology is still undetermined.

More recently, "Preparedness" has been the watchword of government and industry, and Irving Abell, as Chairman of the Health and Medical Committee of the Council for National Defense, in January, 1941, stated:

"If national production is to contribute the full measure to national defense, the medical profession must assume greater responsibility and participate more fully in the health maintenance programs of industrial workers. The essential nature of this responsibility lies in the fact that as war is now waged, the mental and manual work of 12, to state the proposition conservatively, is necessary to maintain one effective combatant in the field."[3]

While industrial accidents and diseases have received most of the consideration by students of industrial medicine, it is becoming apparent that employee lost time on account of non-industrial diseases and accidents is a larger and more important drag on operating efficiency, because of the delay and change necessary to fill in for the missing employee.

One large industry,[5] employing 187,000 hourly rated employees, on recent analysis of time lost account of disability, found that 22,521 employees were disabled some time during the year for periods in excess of seven days, or 12% of all the employees. Of these, 69 were disabled because of occupational diseases, and 1326 because of occupational injuries, a total of 1395, or 0.7%, from occupational causes. As compared with this, 2,221 persons were disabled because of injuries received outside of the plants, and 18,935 because of ordinary non-occupational sicknesses—a total of 21,156, or 11.3% of all employees. The non-occupational illnesses caused 743,558 days lost and the occupational diseases had only 2,483 days of lost time, a ratio of 300 to 1. So it is evident that industrial disease in well controlled industry is an important but minor problem.

Another large industry,[6] employing 17,000 persons, had occasion to analyze their sick benefit plan, and found that the plant population averaged 16 years of service and about 40 years of age. The men averaged one sickness case of eight or more days duration for every 10.7 years of exposure, while the women averaged one case for every 6.7 years of exposure. But, 44% of the men and women had never had a disabling illness of eight or more days duration. On the other hand 13% of the personnel had 50% of the morbidity. Further, 16% of the plant population were responsible for more than 60% of all absences of less than eight days duration. This survey resulted in a company medical examination of one-half of the employees involved in repeated sick claims, and a definite decrease in the sickness frequency of this group as compared with the control group not examined.

IN 1922, we made a physical survey of approximately 2500 train service employees, and the results appeared so promising that the survey was extended to include a more thorough pre-employment examination and annual periodic examination of the entire operating force.

The surveys I am reporting cover the annual periodic examinations of about 9,000 men, and the work has been done by about 60 examiners from 1924 to 1940. For the purpose of comparison, we are reporting briefly the findings of the 1924 and 1940 surveys.

Labor turnover, deaths and retirement have created some change of the men examined. For example, in Chicago, from 1925 to 1940, 5227 applicants were examined for employment, of whom about 10% were rejected on account of physical disqualification and 4697 new men were passed for employment, averaging a 14% annual turnover. This turnover occurs largely in the first five years of employment, before degenerative diseases commonly appear.

The last analysis of age and length of service (1937) showed the average age of these employees was 46 and the average length of employment was 16 years.

In 1924, 9386 men were examined and the recorded physical defects averaged 1.5 per man. In 1940, 8255 men were examined and the recorded physical defects averaged 1.7 per man. Forty per cent of those included in the 1940 examination were employed before pre-employment examinations were initiated.

The routine examination includes a brief questioning for disabilities suffered the previous year, and a general physical examination with the patient stripped. Chemical urinalysis is the only laboratory work done, but further laboratory examinations, such as blood tests and x-ray, are advised if the history or physical examination indicates their need.

After examination the men are classified alphabetically in a descending scale of physical fitness. The proportion of men in each class in 1924 and in 1940 was as follows:

	1924 9386 men	1940 8255 men	
A.	24.76%	17.81%	— 6.95
B.	44.36	41.59	— 2.77
C.	25.86	35.49	+10.13
D.	5.07	5.52	+ 0.45
E.	.45	.69	+ 0.24

Class A—Are men of good physique without defects or diseases.

Class B—Those with defects or diseases of slight importance, not handicapped for work, such as carious teeth, moderate pyorrhea, large tonsils, small varicoceles, moderately defective vision, etc.

Class C—Those with defects or diseases constituting slight to moderate handicaps, or temporary handicaps amenable to correction, such as symptomless heart disease, large varicocele, hernia, bad pyorrhea, chronic nephritis, moderate hypertension, acute diseases, etc.

Class D—Those with defects or diseases constituting serious or permanent handicaps, but able to work, such as heart disease with symptoms, advanced nephritis and hypertension, diabetes, chronic infections, large and troublesome hernias, etc.

Class E—Those with defects or diseases constituting serious and permanent handicaps, which make them unfit for work.

As the preceding figures show, in spite of pre-employment examinations and periodic check-up, there has been in these 16 years a 10% increase in the defects or chronic diseases. It is not feasible to present a detailed report of the findings, but some comparisons of interest may be made of group findings showing the changes that have occurred since 1924. The first column shows the percentage of men found defective in particular ways in 1924, and the second column shows the percentage in 1940. The third column shows the percentage of increase or decrease noted.

	1924	1940	% of increase or decrease
Mouth (dental)	39.12	22.21	— 43%
Cardiovascular	28.23	39.46	+ 39
Eyes	19.11	30.20	+ 52
Genito-urinary	14.72	12.32	— 16
Bones and joints	6.13	9.10	+ 48
Nose and throat	7.23	8.00	+ 10
Respiratory	3.13	1.94	— 38
Digestive	2.40	3.23	+ 34
Ears	1.76	1.71	— 3
Nervous system	1.50	1.96	+ 30
Mutilations	.66	.68	...
Skin	.71	2.65	+273
Inguinal hernia	5.14	7.17	+ 48
Obesity	3.08	7.61	+151
Malnutrition	1.47	3.44	+135
Glycosuria and diabetes	.77	1.85	+140

IN THE 1940 survey:

1. Carious teeth and pyorrhea made up the major number of mouth defects. Frequently they appeared to be the site of focal infection, and these conditions have been materially improved through constant urging and treatment.

2. High blood pressure was by far the most common defect found in the cardiovascular system, the systolic pressure ranging from 150 to 174 mm. of mercury in 13.5% of the men, and in 2.4% the systolic pressure was over 200. Valvular disease of the heart was found in 5% of the men, and usually occurred after the age of 45. Most of these are changes that developed slowly in the fifth and sixth decades of life and persisted for years before becoming disabling.

3. Defective vision of 20/40 or more was found in 26% of the cases, and, when not corrected, correction was advised.

4. Albuminuria and nephritis were the major genito-urinary defects, being found in 4.25% of the cases, while varicocele, usually symptomless, was found in 3.5%.

5. Enlarged and infected tonsils were found in 5.5 per 100 men. Rarely did enlarged tonsils present evidence of trouble.

6. Fourteen cases of active pulmonary tuberculosis were found in 1924; only two were reported in 1940.

7. Hemorrhoids were the principal defect in the gastro-intestinal tract, appearing in 2.5%, while peptic ulcer was reported in only 16 cases, and the diagnosis was based on a typical history or positive x-ray findings, or both.

In diseases of the nervous system, general paresis was diagnosed once and tabes dorsalis twice, while 20 other cases of neuro-syphilis, usually early or latent, were reported.

Of the many miscellaneous defects noted, the most important were inguinal hernia, nutritional defects, glycosuria and diabetes, each of which showed some increase in frequency.

Communicable diseases appear to be well controlled by annual periodic examinations. At the first examination (1923), 100 cases of active gonorrhea and 20 cases of active syphilis were found, while in 1940, only six cases of active gonorrhea and 11 cases of active infectious syphilis were discovered. This does not necessarily prove that our education and practice have prevented the men from contracting these diseases, but does indicate that they are much more aware of the consequences, and take prompt and continued treatment. Education and better treatment in recent years have greatly lessened the complications.

In the examination of 6,587 employees, averaging 2,145 for each annual examination under my personal observation during the past 15 years, a total of 288 cases, or 4.3%, of syphilis in various stages of activity were found. Ten (3.6%) cases were in the primary and 24 (8.4%) were in the secondary stage, while 197 (63.8%) were discovered in the late stage, and 57 (19.7%) had some involvement of the cerebrospinal tract, from a symptomatic neurosyphilis to active tabes and paresis.

A. J. Kammer,[7] in May, 1941, reporting some practical results of routine physical examinations in the industry under his supervision, found that 482 cases of syphilis were diagnosed by repeatedly positive serologies, while only 11 men, or 2.28% of the total, admitted histories of venereal infection, and only 82 men, or 17%, presented physical signs that aroused the examiner's suspicion of the presence of syphilis.

Forty-seven cases of active pulmonary tuberculosis were discovered during the first five years of our survey, while only five cases were discovered by the survey in the past five years. A total of 93 cases have been discovered during periodic examinations and placed under treatment since periodic examinations were inaugurated.

Nutritional defects, especially obesity, are commonly found past the age of 40, but do not materially affect the ability of the employee to work, unless the defects are extreme or are accompanied by chronic conditions such as cardiac or respiratory insufficiency. However, it is well known that obesity in adult life appears to hasten the development of degenerative diseases and to decrease longevity.

Unless there is some special incentive, such as discomfort, pain, fear, or force, the average man under our observation will do little to correct his defects. A positive blood test means little to the man who thinks he is feeling well. A high blood pressure means little to the robust man who has no distress and feels able to do all he has ever done. It takes considerable persuasion to get the obese individual to cut down on his calories, and avoid the excess fats, sweets and starchy foods in his diet. His appetite got him in that condition in the first place, and he usually enjoys fattening foods. How far should we go in cutting down this enjoyment? Will the prediction that he will feel better and live longer under a restricted regimen cause the average man to change his habits? In my observation this is rarely true. In women, vanity may be appealed to with some success, but this rarely works with the male.

The gradual increase in the percentage of inguinal herniae over 16 years from 5.14 to 7.17% seems worthy of note. Herniae are usually discovered when very small and symptomless, and occasionally have been permitted to exist for several years before they were called to the attention of the patient. By discovery of the defect when it is small, and before a complaint of discomfort or disability is made, we have properly corrected the evil of unjust compensation claims. We have not been successful in having the defect corrected by surgery in any fair proportion of cases, in spite of the fact that disability insurance is paid during the employee's loss of time from work on account of surgical repair. We urge that a comfortable support be worn.

It is seen that where there has been an increase, the conditions are usually the result of chronic degenerative changes, or the diseases of aging. Because of this, it would appear that proper direction and advice would be of value in controlling or slowing the process, and we feel this has accomplished beneficial results, but increased comfort and life extension are difficult to measure accurately.

IN CONCLUSION, the results of periodic physical examinations in industry must be used as an honest guide to direct the employee's health and to assist him to improve it, so that he may continue as a safe and satisfactory worker. His ability to work safely and satisfactorily both with regard to himself and to others should be the criterion on which to judge the examination findings.

The company physician is usually "the uninvited consultant" (Selby), and when he discovers diseases or defects which can be corrected in an employee, he can do not more than urge the individual to take proper care—except where the condition is a hazard in the individual's work; and then the physician is not only justified, but, in fairness, is obligated to report the situation to proper authorities, and to suggest proper disposition.

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Instruction in Industrial Medicine for Medical Students

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IN THIS age of tremendous achievement and general advancement in all scientific fields, it is regrettable that the teaching of industrial medicine has fallen behind that of the other branches of the art and science of healing. Why is it that our best medical schools devote only four or five lecture hours to industrial medicine in a four-year course? Why does the worker so often shun his company's medical department? Why do so few graduates of medical schools choose industrial medicine as a career?

It is easy to censure the companies for this laxity in placing industrial medicine in its rightful position. But we should ask ourselves honestly whether we as physicians must not share the blame. It will be admitted that a properly equipped industrial medical department with the necessary personnel is expensive to install and maintain, and it is hard to convince a company that this is a good investment when there is no concrete financial return in sight. Numerous companies have spent money for preventive measures, but in some cases they have been forced into it by law after a noticeable morbidity in operations; and in others, the high compensation rates for industrial hazards have made changes compulsory. In the most successful instances the improvements have been carried out through the company's faith in the physician, who has been able to demonstrate that such measures are not only right but will also prove to be an economy.

This is not a criticism of the heads of industry, but rather an example of the lack of foresight characteristic of all human nature; and the physician must share the responsibility for industrial medicine's present role. The physician has been an integral part of every successful company for many years now, and it is up to him to make for his profession throughout industry in general a place similar to that which it holds in the world at large.

IN TRACING the history of the physician in industry we find a gradual evolution; but how slowly this progress has been made and how woefully it falls behind general medical progress. Originally the physician was called upon to take care only of the man who was injured while at work. No questions were raised as to whether this worker was physically able to do his work. Later the doctor stayed on the company property during the heavy shift and could be called for emergencies. Then, with the specialization of modern industry, the training of each worker became an investment of time and money. It became imperative, therefore, that only fit candidates be hired, and pre-placement examinations were found to increase the safety of the worker, the safety of his fellow workers, and the efficiency of the plant.

Following this trend, progressive companies organized classes in accident prevention, but even this instruction was seldom under the direct guidance of the physician. And now old and new manufacturing processes and materials are studied for possible health hazards as well as the hazards of environmental working conditions.

All of this sounds intelligent, progressive and encouraging. However, the lack of interest with its accompanying effects can be well remembered.

AT PRESENT the surgeon in industry is gradually giving place to the medical man as the idea of preventive medicine is supplanting the repair of the damage done. We have come to realize that laws are not passed in anticipation of unfortunate occurrences, but are enacted only after a situation has become anti-social and has been before the public eye long enough to demand penalties for its continued existence. Has the medical man taken advantage of his new opportunity in the change which has taken place? Is it not the fault of the industrial physician that his place is not more important? Is it not we who are to be blamed for the minor place of industrial medicine in the school curriculum? Is it not our fault that the employee so often lacks confidence in his plant physician?

It is estimated that industry employs 42,000,000 workers in this country at present. This means that more than one-third of our total population is spending 24% of its productive life under the possible supervision and guidance of industrial physicians. The field is a tremendous one and its opportunities are constantly enlarging. Why has a challenge of this sort been allowed to go so poorly answered?

Another challenge to the physician in industry is the responsibility being given to lay groups for the conservation of employee health and for employee safety. All important plants have such personnel, and the results of an energetic well-trained group of this type have been most beneficial to industry. However, is it not deplorable that successful companies with a low percentage of preventable accidents when asked, "What type of medical care is given the employees in your plant?" so often answer, "Our safety man takes care of that." No mention is made of the physician. The plant physician in many such companies is but a necessary evil, and essential only for caring for injuries occurring to employees on duty and for making routine pre-placement examinations.

Is it not lack of proper respect for his job that has pushed many industrial physicians into this secondary place? May not this trend, if permitted to continue, push all into that position in the near future? Certainly it is not humbling our eminent position as professional men to learn something of the type of hazard the workers must face. Is it not better that the physician investigate conditions himself and, with adequate engineering assistance, make recommendations to the employer than be told by the personnel or safety group to examine Mr. Jones for a disease after he has been exposed to its cause. I am not against these groups. I am all for them. They are essential to us. We need them and should cooperate and work with them. But I am not convinced that industrial physicians should be in a subordinate position in matters affecting the health and safety of our industrial workers.

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Most of our laws concerning employee health and safety are the direct result of action by lay people, often by the worker, demanding explanation of hazardous employment and the installation of safety methods and equipment. The physician has merely followed along and improved his technique when and where it was imperative. This situation is in part due to the great majority of men who, when attempting to get started in practice, use the salary received for part time industrial work to pay the rent. They are not primarily interested in this field. They have had no training in it, and as a consequence are not working whole-heartedly. They are willing merely to follow instructions. It does not seem fair that industrial medicine should be handled in this manner.

The 1939 report of the National Industrial Conference Board covering medical and health programs of 301 establishments showed that even in the large plants with more than 5,000 workers, physicians were employed part time more frequently than full time; and that in plants with less than 500 employees, members of the medical profession were invariably maintained on a part-time or call basis. Since more than 60% of the wage earners in manufacturing establishments are employed in plants of the latter category it is apparent that the responsibility for their medical service rests most heavily on the general practitioner who devotes a portion of his time to industrial work.

WHAT is to be done to rectify this condition? First, industrial medicine should be properly emphasized, and the importance of its place in medicine and industry clearly outlined. This can be accomplished only by providing sufficiently well-trained men in this field. With the present interest evidenced by government, labor and industry in the conservation of man power no salesmanship would be necessary to place such a group of understanding men.

This brings us to the second suggestion. Provide in the modern medical curriculum sufficient teaching on industrial medicine to present its scope and its future. This would allow the student to evaluate this branch of medicine for a future field as he does in choosing obstetrics, surgery, etc., for specialization.

Dr. S. Z. Levine, Professor of Pediatrics at Cornell, in his opening remarks to the students this year said, "If the physician is to take the leadership in the health program he must study not only the technique of healing but also such social factors as family income, housing, clothing, nutrition, education and employment." Such preparation, he declared, is either lacking or wholly inadequate in present-day medical education.

The field of industrial medicine is too far-reaching to be covered in undergraduate years, but certain hours should be given to prepare the student for a graduate course similar to the training demanded today for a person admitted to the various specialty boards now in existence. Such courses would fit a physician to be called a specialist. If such a curriculum were adopted and companies could secure pre-trained men, thoroughly acquainted with the problems to be met and handled, I feel sure they would properly remunerate them, and that they would be able to render value received.

SUGGESTIONS for instruction in the undergraduate curriculum would incorporate the following ideas:

1. Industrial medicine should be offered to undergraduates as a separate course. By merely referring to disconnected bits of information in various courses throughout the four-year curriculum as sufficient instruction in this field, the importance of the subject is lost.

2. The lecture hours should include well-chosen topics in a general vein. The scope of industrial medicine, its history and importance should be presented. Following this introduction, such broad groupings as:

(a) Orientation and general considerations.

(b) Placement of the worker from a physical standpoint.

(c) Routine role of the physician in the plant.

(d) Hazardous occupations, preventive measures, and care of employees under these conditions.

(e) General health program for employees.

(f) Research.

3. Field trips should be made to a well-organized industrial medical department, with demonstration of the above topics in action.

Such a program is entirely feasible if as little as 20 hours were given in any one academic year, but preferably the senior year. The surface of the subject would have been only scratched; but a stimulus for future study in graduate work would have been implanted in some; and the entire class would have been afforded sufficient insight into the subject to respect its importance.

I should like also to urge that much thought be given to providing adequate opportunity for graduate teaching in this special field of medicine comparable to the facilities and training offered in other special fields.

The faculty for both undergraduate and graduate instruction may be very readily gathered in the majority of the communities in which medical schools are located. It has been the experience of most of us in the field of industrial medicine that the time and energy of self-trained industrial physicians is available for such teaching. Men for the chemical and engineering phases are likewise readily available.

This presentation has been given as a challenge to you who carry the responsibility of medical education. Let us be able to offer to industry physicians with sufficient knowledge so that they may assume their proper responsibility and status. When these trained men are generally accepted as a necessary part of present-day industrial relations, their work will be a bulwark against certain socialistic trends which are constantly appearing on the horizon.

Industrial Morale

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AS A NATION, we are preparing ourselves for a grave emergency. Such an effort to cope with modern armed conflict implies a dislocation of normal industrial procedures, a confused, anxious period of waiting while our industrial strength is being made effective, and that an immediate and unprecedented importance will be attached to the morale of the ordinary industrial worker.

Industrial populations have assumed a strategic importance in current plans for total war. They are the centers of strength and the first points of attack. Ways and means evolved in the extinction of a dozen countries have been formulated into a polished technique of destruction aimed at industrial populations.

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We may be certain that methods tested in other countries will be brought to perfection here where our democratic processes give a freedom of almost open action. We have assumed ourselves to be a great industrial nation, closely integrated and powerful, whose industrial morale was secured by the world's highest standard of living. Are we so? We must look and see.

We must examine soberly our industrial way of liv-ng, for high morale does not just happen; it grows from unity and mutual regard. It is steadiness in the face of danger, and a willing and personal identification of the individual with the nation's destiny. Our citizens need all the aid they can get to establish clearly and hold to these aims, and especially does the industrial world need sympathy and constructive aid.

A Realistic Approach to Industry

THE factors involved in industrial morale are intangible and almost entirely emotional in their nature. Discussion of them usually generates more heat and emotion than good sense. But, despite temptations to "speak our piece," down underneath we know that only through a coldly realistic study can we hope to avoid costly errors. Here, for instance, are a few blunt summations of the conditions and difficulties which a hasty approach might minimize or ignore:

1. The national danger is still remote and unreal to many of our industrial workers and executives.

2. A part of industrial management is still pursuing business as business, and the government's business as just slightly better than any other business. It is reluctant to expand producing capacity beyond a normal market absorption.

3. American workers are, many of them, on an emotional binge with the first real money they have seen since the depression.

4. The sudden crucial importance of labor—and older labor at that—has found labor organizations with only a primitive organizational framework and no social deftness to capitalize upon that importance. Strikes and the threat of strikes—crude antagonistic action—are still the weapons used.

5. Sabotage and obstructionism are more general than is commonly admitted, and the legal methods of dealing with them are, in general, ineffective.

6. The fantastic expansion in industry has given over the handling of workers to recently promoted men green to authority. Their ignorance will breed disunity and more labor incidents.

7. The employment of marginal labor has brought to industry an unruly undisciplined group that lacks both seasoning and basic training, a group essentially non-industrial people attracted by wage opportunities.

8. There is a very decided shortage of skilled labor and the majority of our skilled workers fall into two groups; those trained before 1932 and subsequently marred by the depression; and those trained under forced draft in the last two years and thus unseasoned by long and varied demands upon their abilities.

9. Racial tensions in industry are apt to reach a higher pitch in this emergency than they did during the last war.

10. Vocal minorities, highly unified and with definite programs, are attempting (with the aid of some newspapers) to speak for the non-vocal majority of workers, and thus influence public opinion against the preparedness program.

11. The present attitudes and the present organizational machinery in industry are *not* conducive to the democratization of purpose necessary to high morale.

12. The general health of younger America is not good. Rejections as high as 32.5% have been made among applicants for enlistment in the Army. Like levels are expected among draftees. In addition, it has been estimated that more than 10% of those finally enlisted should have been rejected as emotionally unstable and unsuited for war-time stresses.

13. Although programs in industrial psychiatry have been in force in England and on the Continent for many years, American industry has made no preparation for the detection, elimination, and handling of mental and emotional maladjustments among its workers.

The Psychiatric Approach

IN THE face of such stubborn conditions as these, no headlong attack upon the problem of morale can hope for success. There is one essential point, however, to hold high above any debate. That is, that sick people cannot, despite their willingness, exhibit high morale, and sickness may be physical, mental, or emotional. Mental and emotional ills are no respecters of persons; they may affect the top executive as readily as the day laborer and, wherever they are, there, too, is a threat to the general morale. The first step in any program is to determine just such points of infection and deal with them.

Even the normal stresses of industry are too much for certain types of personalities, and they break emotionally and perhaps mentally. They must be removed and taken care of. Psychiatry in industry does its best:

1. To eliminate the dangerously unfit.

2. To salvage by effective treatment those who suffer mental and emotional breakdowns and to rehabilitate them in industrial work.

3. To forestall breakdowns by early detection of incipient cases and to remove the causes of maladjustment.

4. To start immediate psychiatric investigation upon the appearance of any of a dozen industrial danger signals.

5. To install standard preventive measures, such as promotional standards, examination of new employees, and periodic conferences during employee crises.

The Projected Program in Industrial Psychiatry

THE need for these normal medical procedures in times of emergency has been clearly recognized and in addition, measures are being taken to meet the abnormal conditions preceding a war. In a war of nerves, we must expect psychological casualties. But, how many must one expect? Specifically, how many workers in industry will need psychiatric attention under emergency conditions? No one knows exactly, but there are some reasonable premises to work with. Some workers break under the strains of normal industry; others under the pressures of emergency production; and still others only under the impact of actual attack in war. Using past records as a base, workers benefitting by psychiatric treatment of some sort in normal industrial conditions are estimated at 25% of a mixed male and female employed group, executive personnel included.

Full emergency production with its use of marginal labor and its industrial crowding will raise that percentage to 30 or more. In severe war conditions, the percentage may rise to as high as 50, though in this latter contingency the psychiatric controls and treatments would be far more pervasive and effective.

Such high percentages need not be alarming. They are instances of preventive actions; that is, they represent the individuals on the danger line those who, if not treated in time, might become incapacitated for industrial work. The full implications of these percent-

ages do apply, however, in any consideration of morale, for a maladjusted employee impairs not only his own efficiency but by irritation and emotional drag he also affects those workers in contact with him. Also, there is always the grim possibility of an emotional avalanche, of mass hysterias and paranoid fears starting from just a few distraught employees. Again, if the affected worker is a ranking executive, the damage to general morale through his actions may be quite severe.

Unfortunately, the full machinery for applying psychiatric controls in industry does not now exist in this country. For various reasons we have not duplicated the psychiatric industrial programs which have been in action for many years in England, Germany, and other Continental countries.

We have made something of a beginning here, though. As part of the defense program, the Sub-Committee on Personal Relations in Industry, has set up a plan of action, and a full scale application will be set up in one or more pilot areas. Training facilities for special work in psychiatry for doctors and nurses are being established and a broad educational plan for industry is being arranged. The Committee hopes to effect this neglected medical protection for the whole of industry. It is aiming at placing trained medical workers in every major American industrial plant so that the expected emotional tensions can be gauged and accounted for.

Some Avenues to Direct Action

THE psychiatric program envisaged by the Committee is just one of the primary steps toward the maintenance of high industrial morale. It must be implemented by programs of other agencies directly geared to the various phases of industrial life. Each of the larger groups in industry—management, investment control, professional skills, unions, clerical aid, trade workers, peripheral industries—each of these has a vital effect upon general morale. Each, too, has its peculiar characteristics, its crotchets and fancies demanding special treatment and sympathy.

One cannot reduce the panorama of emotional tensions to capsule form without imparting a false appearance of simplicity to the general problem of industrial morale. Yet, our time is short. We must advance into direct action as soon as we can. Perhaps these suggestions will serve as focal points for study and discussion. Deliberately, they have been made positive in the hope that they will bring forth discussion and debate:

1. Set in motion a vigorous, broadly-based program to combat adverse propaganda and its attendant ills of sabotage, obstructionism, and racial exploitation.

2. Enrich the symbolism of the American worker, who has an understandable reluctance to die for an entry in a business ledger; use every dramatic device to make him see the defense use of his product whether that product be a tank or a set-screw.

3. Provide emotional insurance to industry by the widespread use of trained medical observers.

4. Clear the industrial decks by eliminating or neutralizing the emotionally unfit, but begin first at the top of the industrial world and work down.

5. Prevent absorption of the unfit by testing all new employees and all aspirants to promotions.

6. Educate all the industrial levels appropriately in the mental and emotional hazards of wartime production.

7. Keep a close watch upon the excited enthusiast who will drive himself and others to a nervous breakdown.

8. Help the union leader to handle his men more effectively so that he will not have recourse to the crude methods of strikes and work stoppages. Put certain aspects of training and social protection entirely in his charge.

9. Give special training to the apprentice and to the foreman in the civilized art of meeting and handling authority.

10. Stop worry at its source by securing the worker's home and family through organized plans for evacuation and for complete compensation in the event of military damage.

11. Advance morale by direct action of a coalition committee made up of representatives from every proper industrial and community organization.

These suggestions are thrown out tentatively for consideration. The more thought given them, the better we may be able to assess the general problem of industrial morale and arrive at a concerted program of action.

Treatment of Painful Backs

—Due to Myositis, Fascitis, and Neuritis—

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WHEN one attempts to correlate all that has been written and said about back pain, low-back pain, sciatica, fibrositis, lumbago, "railroad spine," etc., he is impressed by the confusion and controversy that still exist, even though the last 10 years have brought improved means of diagnosis and treatment, and certainly much discussion in medical literature.

The authors, of course, believe that the causes of backache are many.

A recapitulation of causes does not produce a long list, and may be enumerated as follows:

1. THE ACUTE PAINFUL BACK, consisting of several groups:

(a) Exacerbation of symptoms long present and otherwise grouped in the chronic type. The causative factors may be: (1) disease of the soft parts or bone; (2) postural disturbance, habits of occupation, anomaly or congenital malformation; (3) disease of extrinsic origin, such as the viscera; (4) old injury, either of soft parts alone or associated with bone injury, the latter since healed.

(b) Acute sprains and strains produced by indirect injury such as lifting.

(c) Bruises and contusions produced by striking the soft parts.

By the acutely sprained or strained back we mean the one Meyerding and Pollack[1] have pointed out follows overdoing in a sport event or a new or unusual form of work or effort.

Ryerson[2] suggests that lifting a heavy weight, pushing up a window which sticks and suddenly gives, or striking viciously at a golf ball or baseball, may produce severe pain which often completely disables a strong man.

Where the history is truthfully given in such cases one may expect relief to occur in 10 to 12 days with rest and the application of heat, and these individuals have no after-effects. Nevertheless such should be

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examined radiographically just as surely and completely as those where a direct violence has occurred, which form the second group, in which we may expect to find fractures, or where definite contusions with hemorrhage into the soft parts occur. This group may be a factor in producing painful backs which become chronic.

The contusion to the soft parts should be treated symptomatically, also by rest, application of cold for the first 12 to 24 hours followed by heat if indicated.

2. THE CHRONIC BACKACHE is the problem which we particularly desire to call to your attention. There is a group in which the victim is reluctant to admit the fact that he had had a painful back previously, and attempts for obvious reasons to emphasize the suddenness of its onset while lifting, stooping, reaching or bending, while in reality the condition existed before with recurring attacks of pain and intervals during which the back was not painful.

There is a second group in which previous injury or disease or backache is admitted, and in such we find those which have been referred to as: (a) chronic fibrositis; (b) myositis and myofascitis; (c) "sciatic syndrome" or "sciatica," or those in whom the back pain radiates or is referred down the leg.

Most of these have their origin in focal infection, with chronic inflammatory changes or scar tissue forming in the muscles and ligaments at the bony origins and insertions or in the fascial planes between the fibers. The painful ridges or infiltrations can be palpated, and often crepitus is elicited as well as pain upon palpation.

The chronic sore back may be produced by the combined factors of increasing age and hypertrophic bony changes with narrowing of the joint spaces and resultant decreasing flexibility of the spine and its attached soft parts coupled with the effects of daily posture. Often, too, increasing obesity shares in the production of such a painful back.

In others the same condition may be the residuum of a previous acute trauma, in which intra-muscular or intra-fascial hemorrhage occurred with the formation of scar tissue.

We believe that the true sciatic neuritis should be an entity in itself. In its acute stage it produces a tender nerve, severe pain, loss of function and sensory disturbance, and has the same etiology as any other neuritis, namely, focal infection, toxic or chemical poison, disturbed metabolism and vitamin deficiency. It tends to become chronic with formation of adhesions in the nerve sheath so that the normal mobility of the nerve is painfully restricted, not only of the main-trunk, but the divisions and branches into the muscle tissue as well.

IN THE procedure for diagnosis in these acute and chronic types of pain of the soft parts of the back the examination should be painstaking.

1. Thorough physical examination should search for foci of infection, metabolic disorders, dietary deficiency, bad habits of posture, eating and drinking; and routine laboratory procedures should be done.

2. The patient should be observed standing, walking, sitting with legs straight and legs flexed, and lying on the back, abdomen and side.

3. Each joint should be tested for range of motion and painfulness.

4. Soft parts should be palpated for points of tenderness and the location of fibrous ridges should be determined.

5. Special tests for disturbed sensation should be made.

Thompson[3] has given a complete procedure for the above which, if done thoroughly, leaves little to be desired, and after a thorough x-ray examination has been made the examiner is in a position to consider the choice of treatment for alleviation of the symptoms. (It is to be noted that we have not said removal or treatment of the cause or condition, but alleviation of the symptoms.)

THE treatment of the acute cases has been mentioned. The treatment of the chronic cases resolves itself into two groups.

1. Physiotherapy in which massage alone produces relief.

2. Physiotherapy in which massage is supplemented by forcible stretchings under a general anesthetic.

Before physiotherapy is instituted there has been a diligent search for conditions which by being removed or treated may remove the causative factor.

Foci of infection, disturbed metabolism, excessive eating and drinking, dietary deficiencies and posture are corrected if present.

If the examination has disclosed only a moderate amount of limitation of motion, and, therefore, relatively little scar tissue or infiltration, the patient can be ambulatory during the treatment and may even follow his usual daily routine.

Gentle massage is started, known as effleurage. The hands of the masseur are lubricated, as is the skin of the patient, with a substance such as albolene. The effleurage begins at the periphery and is constantly directed in one direction only. The purpose is to stimulate the circulation, and it is continued and done each day during the treatment.

Firm and deep massage follows, known as persiflage.

Where the motion of either or both lower extremities is limited or where the soreness radiates into them the legs are then flexed forcibly, keeping the other extended.

The adhesions can often be separated without resorting to a general anesthesia.

Where the motion is markedly restricted and there are dense infiltrations it is necessary to give the patient a general anesthetic, usually the morphine-scopolamine and gas combination.[4,5]

As the manipulation is done, the separation of the adhesions cannot only be felt, but can also be heard.

These stretchings are repeated at intervals of from three to five days, and usually three to five stretchings suffice.

Frequently, after the first of the stretchings and almost always at the completion of them, discoloration appears in thighs and buttocks.

During the period in which the stretchings are being done the patient is kept in bed. Light massage is continued each day, unless there is a marked reaction in the soft parts.

At the end of two weeks the patient is helped out of bed and taken for short walks each day. The manipulations are then resumed without anesthesia.

The period of treatment in the severe cases often requires several months, but when it is remembered that the condition has been present for a long time, in many cases as long as 20 to 30 years with disability at intervals, requiring many weeks of lost time, this loss of time is then minimized.

In our experience this treatment has produced the most satisfactory results in those painful backs where myofascitis, fibrositis and neuritis are present, especially where the condition is chronic and of a recurring nature.

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Industrial Medicine in Britain

—Summary of Recommendations—

THE COMMITTEE ON INDUSTRIAL HEALTH IN FACTORIES, appointed in 1940 by the Council of the BRITISH MEDICAL ASSOCIATION, published its report late in 1941. The following is the Committee's Summary of Recommendations:

Provision of Medical Supervision

THERE should be in every factory, large or small, arrangements for the medical supervision of workers. Such supervision implies the care of the individual worker in his industrial environment; the prevention of physical and mental illness; the initial treatment of injury and sickness; and a medical liaison between the factory and outside medical services. It should aim at reducing the general sickness rate as well as the accident rate.

Duties of Industrial Medical Officers

THE duties of the industrial medical officer should include:

(a) The medical supervision of employees during working hours;

(b) The supervision of general working conditions;

(c) The organization and supervision of the accident service, including rehabilitation;

(d) The study of specific occupational hazards and the preventive measures necessary for their control;

(e) Assistance in a professional capacity for the A.R.P. services of the factory.

3. A medical examination would be valuable in many cases in making possible the proper placing of workers according to their degree of fitness.

4. It is desirable that all workers returning after prolonged absence due to illness should be seen by the industrial medical officer, who should supervise the return to full working capacity.

5. Special attention should be devoted to the care of the adolescent.

6. The special problems of the woman worker, which are of a sociological and economic, as well as a medical, character, should receive attention.

7. The Committee endorses the recommendations of the Association's Committee on Mental Health so far as they affect industry.

8. The industrial medical officer should devote some of his time to talks with individual workers, and should encourage the management to undertake health education among the employees.

9. The keeping of adequate records of sickness absence should be made compulsory. The Committee suggests that the Industrial Health Research Board should reconsider in the light of experience the form of record it proposed some years ago.

10. The industrial medical officer should maintain harmonious relations with the workers, and his colleagues in the factory and with local general practitioners, hospital staffs, and public health and government officials.

Staffing of a Medical Department

THE industrial medical officer should have good experience in general practice, some special knowledge of the treatment of injuries, an interest in occupational hazards, and knowledge of social conditions in an industrial community.

12. The industrial medical officer should be directly responsible for all health services to the managing director.

13. Appointments of industrial medical officers should be whole-time or part-time according to circumstances. A salaries scale is suggested.

14. A whole-time industrial medical officer should be given opportunities for post-graduate work.

15. A central advisory body should be established to advise and guide employers in making suitable appointments to industrial medical posts.

16. There should be interavailability of industrial medical posts.

17. Nursing staff should be responsible to the medical officer. Facilities for the training and retraining of industrial nurses should be available. Some training should also be provided for assistant nurses and ambulance men.

Relations with Outside Medical Services

IN ORDER that the efficiency of general practitioner treatment of industrial patients may be increased there should be:

(a) More emphasis in medical education on the relationship between industry and disease;

(b) Continuous interchange of information during the progress of an illness;

(c) Closer association between industry and the medical profession.

19. There should be facilities to enable the general practitioner to make himself acquainted with the work of his patients or of any one patient, so that this knowledge may help him to decide how far a patient's health is affected by his work and to advise and prescribe accordingly.

20. When a patient is admitted to hospital the hospital staff should cooperate as far as possible with the industrial medical officer and keep him informed of the patient's progress.

21. The general practitioner should be given an opportunity, when the patient is discharged from hospital, of indicating whether he wishes to undertake redressings himself.

22. While an extension of hospital facilities for the treatment of industrial accidents is welcomed, it should not be allowed to obscure the need for the medical supervision of workers within the factories.

Rehabilitation

THE Committee endorses the need for rehabilitation units.

Medical Education for Industry

THE relationship of industry to health and disease should be given a more prominent place in the medical curriculum. More university posts relating to industrial medical practice should be created.

25. Facilities for post-graduate instruction in industrial medical practice should be extended.

Industrial Health Research

FOR the purpose of extending industrial health research on an adequate and efficient basis it is recommended that a national and regional organization be set up, with a trained staff and proper equipment, with the objects:

(a) To undertake research into industrial scientific problems affecting health;

(b) To collect and analyze sickness records, establish facts, and formulate theories from the analysis;

(c) To test these theories in practice and to attempt to solve any other practical problem submitted from a factory;

(d) To disseminate the knowledge, wherever it can be applied, of any definitely established fact that bears upon the health of workers.

The Future of Industrial Medical Practice

WHATEVER the direction of post-war medical reorganization, adequate provision should be made for the efficient coordination of the industrial medical services with all other branches of medical service, the association of the family doctor with the factory life of his patients, improved training and regular post-graduate courses for industrial medical officers, and systematic medical research in industry.

The Teaching of Industrial Health

THIS report on the teaching of industrial health has been prepared jointly by committees representing the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS and the COUNCIL ON INDUSTRIAL HEALTH of the American Medical Association. The underlying arguments for improved teaching of the essential factors in industrial health have been submitted to the Council on Medical Education and Hospitals which in turn has acknowledged the urgent necessity for calling existing deficiencies strongly to the attention of medical educators and the profession at large and for the submission of suitable recommendations aimed at their correction.

RECENT events have made it plain that the health of the industrial worker is vital to national security. Yet with notable exceptions the requirements of industry in the fields of industrial medicine, surgery, and hygiene are being met in very incomplete and fragmentary fashion, without clear realization of objectives or their value to the health status of the community as a whole.[1] It is equally clear that the medical profession has been hampered in its approach to this useful and expanding professional activity and will continue to be hampered until adequate provision is made for instruction in modern industrial health methods, both before and after graduation.

Professional Groups Involved

MEDICAL service to industry flows through three principal professional channels:

1. The private practitioner in general or special practice serving on call or part time. Best current estimates indicate that 80 to 85% of medical service to industry is supplied in this fashion. As such it has been mainly remedial in character to such an extent that medium sized and small plants have been left without the considerable advantages of preventive industrial medicine and surgery.
2. The full-time industrial physician serving in one or several plants who exemplifies specialty practice in industrial health. In addition to prevention and treatment of compensable disability, he is concerned with the details of medical department administration.
3. The medical industrial hygienist more frequently associated with governmental agencies who provides a consultative and investigative service directly to industry and to the medical profession, as well as enforcement of public health and sanitary codes relating to conditions of work.

In each of these classifications, there are definite shortages of well-trained personnel.[2] To meet these varying educational requirements medical and professional schools and medical societies singly and in combination are under heavy obligation to create or improve opportunities for training in undergraduate and continuation courses and for extended graduate study.

Content and Organization of Teaching

EXPERIENCED physicians in industry have testified that industrial health activity falls into three principal categories:

1. Industrial medical administration.
2. Industrial medicine and traumatic surgery.
3. Industrial hygiene and toxicology.

For physicians who expect to meet the ordinary medical needs of industry, proper grounding in each of these major subdivisions should be provided, beginning in the undergraduate curriculum. The outline which is appended to this report has been prepared in recognition of these basic requirements of a well-rounded understanding of industrial health service.

Actually only a very few medical schools have made this type of instruction available. Industrial hygiene is widely taught as a relatively minor function of preventive medicine and public health. Problems in industrial medicine and surgery are presented without any relation to prevention of and control over exposures, and only as examples happen to present themselves in clinics or wards. Industrial medical administration has been almost completely ignored. Yet the experience of a number of medical schools amply demonstrates that reasonable acquaintance with the whole subject can be provided at modest expense through judicious use of time and readily available teaching and clinical material. The all-important requirement for improved instruction is a unified plan which assigns over-all responsibility for coordinated classroom discussion, field studies, laboratory and section work to one single teaching division, preferably preventive medicine and public health. There must always be considerable dependence on clinical teaching in the medical and surgical aspects of industrial practice, but the testimony of recent graduates clearly indicates that older methods of divided and unrelated instruction fail to provide dependable and reasonably complete information.

As a matter of fact, progress would be greatly accelerated if many more medical and graduate schools, especially those in industrial areas, could develop or attract support for the organization of separate teaching divisions in industrial health, each with its own faculty, affiliations for clinical and demonstration material and facilities for laboratory and field investigation and consultation. Good precedent exists for independent organization of this character. Under such an arrangement, there should be greatly improved prospects for the attraction of special teaching talent and material, of support for research into a thousand aspects of industrial health crying for investigation and for the promotion of advanced training at graduate and fellowship levels.

Plan of Instruction

THE essential requirements for teaching industrial health can most briefly be described as follows:

A. Undergraduate Teaching:

1. Required Courses—These courses should provide lectures, laboratory experience, industrial history taking and record keeping, section work in wards and clinics, and field trips in accordance with the attached outline.
2. Elective Courses—Electives should provide opportunity for more detailed and specific study, personal participation in special projects, individual patient study or personal experience in plant or laboratory. Time allotment will vary according to nature and extent of subject matter.

B. Continuation Study:

Since most practicing physicians have had little opportunity for organized instruction, introductory and refresher courses must be provided by universities, county, state and special medical societies or combinations thereof. The attached outline can serve as a model suitably modified to fit special requirements.

C. Extended Study:

The detailed course outline can serve as a framework for study, graduate in character, calculated to prepare physicians for full time specialty practice in industrial plants or industrial hygiene laboratories. Modifications will be necessary at such time as certification for industrial practice develops. More weight must be assigned to administrative details, personnel relations, legal and social medicine, toxicology, pathology, physiology and public health methods. Courses should be designed to establish competence in industrial health in its own right and not as a minor component of advanced teaching in public health.

Outline of a Course in Industrial Health

THE outline of a course in industrial health which follows is based upon the three major constituents of medical service to employed groups—industrial hygiene, industrial practice, and administration. Under each principal heading is incorporated a general statement explaining in broad terms its importance in the teaching program, followed by a more detailed listing of sub-headings. Specific recommendations are also presented about teaching methods and facilities.

In general, the recommendations refer to required instruction for undergraduates. For more detailed instruc-

tion, suitable additions can readily be made or examples of existing syllabuses may be examined on application.

I. INDUSTRIAL HEALTH ADMINISTRATION:

A. General Statement:

Present interest in working conditions and the welfare of workers follows a century of social and labor legislation which has culminated in workmen's compensation and social security enactments. As demands for industrial health supervision increase, physicians will be invited to organize and administer medical departments in factories, mines, stores of all types and sizes. The experience of many physicians in industry demonstrates that service of this nature can operate efficiently, ethically and scientifically and in full recognition of the best interests of worker, employer, official agencies, the general medical profession, and the community at large.

B. Organization for Teaching:

With rare exceptions, well-conducted industrial medical departments are readily accessible to most teaching centers. Directors of such departments are usually qualified to teach administrative procedure and to demonstrate it directly in the working environment.

About a third of assigned hours should be allotted to administrative methods equally divided between classroom discussion and visits to acceptable plant medical departments.

C. Course Content:

1. Origin and Later Development of Industrial Health:
   - (a) Clinical interest in occupation and health.
   - (b) Legislative background:
     1. Factory acts.
     2. Workmen's compensation.
     3. Social security.
2. Occupational Morbidity and Mortality:
   - (a) Causes and duration of lost time in industry.
     1. General experience.
     2. Experience in specific industries.
   - (b) Reportability of industrial accidents and diseases.
3. Distribution of Industrial Health Service:
   - (a) Scope and objectives of industrial health.
   - (b) Population groups involved:
     1. According to plant size.
     2. According to type of industry.
   - (c) Costs of medical service in industry.
   - (d) Economic and other benefits.
4. Classification of Industrial Physicians:
   - (a) On call and part time (detached).
   - (b) Full time (attached).
   - (c) Consulting services:
     1. Industrial hygiene.
     2. Clinical specialties.
   - (d) Qualifications for industrial medical service.
5. The Industrial Medical Department:
   - (a) Organization:
     1. Personnel.
     2. Plant and professional relations.
   - (b) Quarters and equipment.
   - (c) Specific functions:
     1. Treatment and hospitalization.
     2. Prevention and sanitation.
     3. Health conservation:
        - (a) Physical examinations.
        - (b) Health education.
     4. Rehabilitation.
   - (d) Special Medical Problems of Small Plants.

II. INDUSTRIAL HYGIENE AND TOXICOLOGY:

A. General Statement:

Employers and workers alike look to prevention as the cardinal principle for reducing the incidence of disability in industry. They have learned by experience that health conservation promotes efficiency, earning power, and industrial relations. Physicians who serve in industry must be acquainted with dependable means for recognizing and controlling unhealthful occupational risk. The extraordinary development of industrial technology has multiplied these dangerous exposures tremendously. In addition to the procedures related to industrial hygiene and toxicology directly, there are equally important problems associated with adapting industrial medical activity to programs of adult hygiene in official and community health and welfare agencies.

B. Organization of Instruction:

Facilities and personnel necessary for adequate instruction in industrial hygiene are available singly or in combination through access to—

1. Bureaus of Industrial Hygiene in state or local governments.
2. Departments of biochemistry, physiology, clinical pathology and toxicology in the medical schools.
3. Suitably equipped independent or plant industrial hygiene laboratories.

About one-third to one-half of available hours should be allotted to industrial hygiene—toxicology giving equal consideration to didactic work and laboratory demonstration.

C. Course Content:

1. Industrial Health Exposures:
   - (a) Classification.
   - (b) Essential toxicology.
   - (c) Safe concentration codes.
2. The Plant Survey:
   - (a) Identification of exposures:
     1. Medical procedure.
     2. Engineering procedure.
   - (b) Control of exposures:
     1. Medical.
     2. Engineering.
   - (c) Maintenance of control.
   - (d) Records.
3. Plant Sanitation and Hygiene:
   - (a) Water supply.
   - (b) Waste disposal.
   - (c) General housekeeping.
   - (d) Illumination.
   - (e) Ventilation and air conditioning.
   - (f) Noise and vibration control.
4. Personal Hygiene for Workers:
   - (a) Toilets and washrooms.
   - (b) Fatigue control.
   - (c) Nutrition.
   - (d) Housing.
   - (e) Recreation.
5. Coordination of Industrial and Community Health Service:
   - (a) Communicable disease control.
   - (b) Industrial waste control.
   - (c) Vital statistics.
   - (d) Safety codes and regulations.
   - (e) Factory inspection and regulation.

III. INDUSTRIAL MEDICINE AND TRAUMATIC SURGERY:

A. General Statement:

Most medical service supplied to or through industry is aimed primarily at the individual worker suffering from compensable disability. Full restoration of the injured worker to his former earning capacity in the same line of work and without unnecessary delay is the ideal objective. The physician in industry must also recognize the considerable preponderance of nonoccupational injuries and disease as a factor in industrial absenteeism and the consequent necessity for proper correlation between industrial and private medical practice. This component of the training should also provide reasonable acquaintance with the industrial application of such commonly employed consulting services as dermatology, ophthalmology, neuropsychiatry, orthopedics, radiology, jurisprudence, and others.

B. Organization of Teaching:

Clinical material in industrial medicine and surgery is abundant in most localities. Special affiliations and arrangements with agencies listed below will be necessary:

1. Departments of surgery, medicine and jurisprudence in the medical school and with the principal related surgical and medical specialties (ophthalmology, dermatology, occupational therapy, etc.).
2. Industrial outpatient clinics and hospital wards.
3. Industrial medical departments and dressing stations.
4. Workmen's compensation and rehabilitation agencies.

From one-third to one-half of available time should be

assigned to industrial medicine and surgery. Principal emphasis should be placed on individual case study of ambulatory and bed patients with suitable supervision and correlated classroom discussion.

C. Course Content:

1. The Worker and the Job:
   (a) The worker:
      1. Physical and mental fitness.
      2. Aptitude tests.
      3. Medicine and personnel relations.
   (b) The Job:
      1. Physical and mental requirements.
      2. Duration—hours and wages, day, night, peak loads.
      3. Special processes, equipment and working conditions.
      4. Environmental factors.
2. Industrial Accidents:
   (a) Incidence and costs.
   (b) Classified causes.
   (c) Emergency care and transportation.
   (d) Surgical management.
   (e) Prevention.
   (f) Estimation of disability.
   (g) Records.
3. Occupational Diseases:
   (a) Etiologic classification.
   (b) Pathology and toxicology.
   (c) Medical management.
   (d) Prevention.
   (e) Disability evaluation.
   (f) Records.
4. Non-occupational Disability:
   (a) Incidence and costs.
   (b) Classified causes.
   (c) Medical advisory service.
   (d) Follow-up service.
   (e) Records.
5. Workmen's Compensation and Rehabilitation:
   (a) Administrative methods.
   (b) Medical relations and regulation.
   (c) Insurance practice.

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Urology

—Some Industrial and Compensation Aspects—

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THE recent great progress in the development of industrial accident insurance, state workmen's compensation commissions, and public liability insurance brought problems in diagnosis, and difficulties in the determining of responsibility for injuries of the genito-urinary tract. Many points are controversial among urologists, and, with the increasing importance of this subject, the questions of compensability of various lesions and of acceptable diagnostic methods must be clarified.

The relationship between the etiology and the disease is clearly evident in a majority of instances of trauma to the genito-urinary organs; however, some types of uro-genital disturbances place the diagnostician in a quandary when it is for him to decide whether compensation is warranted by reason of occupational or traumatic origin. In both the debatable and the clear-cut cases, the urologist is required to give not only a positive written diagnosis satisfactory to the insurance companies, but also the reasons for his conclusions.

We limit our observations in this paper to the more common traumata of urologic interest, although unique lesions are constantly being added to the field of industrial urology by various industries. Such examples are the nephropathies of chemical origin and the papillomas of the bladder incident to aniline dye exposure. The status of radium, x-ray, or chemical sterility is as yet unclear. These non-traumatic or "contact" diseases will require further investigation.

COMPENSABILITY: In order to determine the compensability of trauma to the genito-urinary organs, the urologist must routinely answer questions for the compensation courts as to etiology and the apparent placement of responsibility. Of these queries, the most important are:

1. The certainty that the injury occurred;
2. Whether the trauma was sufficiently severe; although this latter feature may be disregarded in certain of the injuries to the kidney, bladder, and testicle where the amount of force of direct trauma need not be very great;
3. The relationship of the time of the injury with appearance of symptoms of the disease; and
4. Whether there was any pre-existing disease which played a part in the injury or which might confuse the ordinary convalescence.

To satisfy these issues, for the injured, and for the employer, the carrier, and the industrial commission, it may be necessary to make use of all laboratory tests and all clinical methods.

EXAMINATION: It is vital that the examiner approach the patient with an open mind, without any appearance or suggestion of suspicion that the patient's injury may not be the cause of his disease. The examination is much more easily performed with the patient's spontaneous cooperation than in those cases where he believes the examiner merely a legal tool interested in preventing just compensation. Alertness toward detection of malingering should not be forgotten, but should not be apparent at any time.

Of course, the examination is most satisfactory, especially in ascertaining the traumatic causal relationship, if performed early. In such an early study, the patient's status before the injury may be more accurately determined. Similarly, subsequent disturbances, not associated with the original trauma, may be delineated. An example of such an event is a case of traumatic laceration of the urethra, followed by a stricture, upon which there is superimposed a gonorrheal urethritis at a later date. This patient was fortunate in having the post-traumatic stricture noted before he acquired gonorrhea.

Similarly, "orthopedic" stones may form in patients who are bed-ridden for long periods of time, especially with fractures. However, they may be present before injury, and a preliminary genito-urinary tract x-ray would enable us to determine the time of occurrence of stones if taken early after injury.

A careful history is of importance and should be taken as early as possible after the trauma. In the confusing cases, it is more satisfactory to have the details as the patient has them, even though they are possibly uncertain in his mind, than to get them from him at a subsequent date, when by frequent repetition, he may have definitely convinced himself of their occurrence.

Of particular significance in the study of urologic compensation cases is a careful and exact analysis of

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all antecedent records of the patient, in respect to investigations of the urinary tract, symptoms, and urinalyses. Such records, both of the early phases of the presenting disease and those giving the patient's medical history and background at an earlier time are valuable. When calculus or tuberculosis is under consideration, with trauma as a possible etiologic factor, the most minute examination of previous medical findings is required in order to postulate such a causal relationship and to place the responsibility justly. Similar investigation would apply to those cases of hydronephrosis, renal cysts, and renal infections in which an injury may be held accountable.

The examination itself must be thorough. Since it will be subject to critical analysis by others, both from a medical and legal standpoint, it must include details which the examiner may consider otherwise unnecessary. An example of this would be in renal function studies, in which one urologist would consider excellent excretion of indigo-carmine as observed cystoscopically to be adequate evidence of good renal function; however, others may consider the phenolsulfonephthalein quantitative test of vital importance, and some may insist that the concentration and dilution tests or the urea clearance test are the only ones by which accurate evaluation of renal reserve may be made. For compensation and insurance consideration, it is often advisable to perform a variety of diagnostic procedures, some of which could be conceived as corroborative rather than reduplication.

The urologist can take nothing for granted in his examination of a patient. He must maintain a fair attitude toward findings of previous examiners, but should not neglect any features of his examination even though they may have been performed. In the interval subsequent to a previous examination, further changes in the disease may have occurred; the interpretation of findings may vary from time to time; or findings not apparent to others at an earlier date may present themselves.

Even in studies of normals, the pyelograms may show small variations in appearance at different times. The most debatable point in any urologic examination, the cystoscopic interpretation, warrants that all consultants carry out cystoscopic examination at the same time, in order to preclude the necessity of subjecting the patient to repeated urethral manipulations. Most patients with genuine claims do not hesitate to consent to present-day ambulatory office cystoscopy where adequate topical anesthesia renders the discomfort minimal.

Injuries to the External Genitalia

BECAUSE of the exposed position of the external genitals, injuries to this region make up a large part of compensation cases observed by the urologist.

With such cases, the investigation for pre-existing disease is of importance. The urethral secretions must be studied for presence of pus and gonococci. Old strictures may be present and their exact location should be determined. The existence of a hydrocele before injury should be ascertained, since many believe that hematocele occurs more frequently when there is a antecedent hydrocele. Old operative scars frequently give the examiner a lead to previous operations which might have affected the external genital organs. For example, atrophy of the testis occurs, not only due to direct physical trauma, but not infrequently as the result of operative repair of hernia. The frequency of hydrocele subsequent to herniorrhaphy also has been observed in numerous cases.

Just recently we observed one of the more unusual types of compensation problems, the so-called "fractured penis." This is always a result of injury. It occurs more frequently when the penis is in the erect state. Therefore, before allowing this to be compensable, actual witness evidence of the injury is important, since fractured penis may occur (1) during strenuous intercourse, or (2) in an attempt forcibly to reduce an erection.

Because of the associated psychic factors in this type of injury, investigation should be directed toward establishment of the patient's previous sexual capability. A trial of conservative treatment is essential, since operative procedure may be followed by impotence, either psychogenic, anatomic, or falsified "compensation" in character. If the patient becomes impotent after any surgical intervention, the carrier may be held responsible.

Our recent case claimed that he slipped in a shower bath when he finished his work at night, injuring his penis. Owing to the hour, no one was present; he did not report it until the next day. We examined him three weeks later and found an encapsulated hematoma. He is still receiving conservative treatment in order to avoid any operative procedure.

"TRAUMATIC" EPIDIDYMO-ORCHITIS: All shades of opinion exist among urologists as to the importance of trauma as a causative agent in epididymo-orchitis. The scale ranges from some who claim that this entity does not exist to others who feel that it can occur after very minimal injuries. We believe that such events as heavy lifting, severe sudden motions, and over-abduction of the legs do not cause epididymo-orchitis. Usually in these cases, observed as compensation problems at first, one can find evidence of an inflammatory focus in the prostate or seminal vesicles, a smear and culture may sometimes reveal them to be of gonococcal origin. Direct trauma is the only method by which "traumatic" epididymo-orchitis has been caused in all of the cases which we have seen. In these insurance problems, the differentiation of "traumatic" from gonococcal involvement of the epididymis is of importance. The patient may appear for examination with the urethra previously cleansed by urination, irrigation, or other local treatment. Evidence of inflammation may be found only by studying (1) scrapings from the anterior urethra, (2) the urine sediment, and (3) the prostatic secretion.

In the gonococcal inflammations, the epididymis rather than testis is exquisitely tender, whereas in the traumatized gonad, both components usually exhibit varying degrees of tenderness.

The specific factor that direct trauma is necessary in order to justify a diagnosis of traumatic epididymo-orchitis has impressed us with the advisability of protective devices wherever industrial hazards exist, similar to those used in strenuous athletics.

Injuries to the Perineum

TRAUMA to the perineum is of concern only in the degree in which injury has been caused to the urinary tract. In occasional wounds of the urethra, there may be no apparent contusion or laceration of the skin. There may be urinary extravasation with or without the presence of infection. The time relationship of the examination to the occurrence of the trauma is of greatest importance in so far as it is necessary to rule out a pre-existing disease or injury. The emergency treatment of traumatic lesions need not be delayed, since investigation of the urethra is a part of the routine pre-operative study to establish proper management of the case. The urethral secre-

tion should be examined early. This preliminary examination and the taking of a careful history before treatment give clues as to the existence of a preceding stricture or infection.

Trauma to the perineum is especially dangerous in the presence of tuberculosis of the prostate. Miliary tuberculosis has supervened shortly after traumatic dissemination from a prostatic focus; and statistical studies by Auerbach and ourselves at Sea View hospital show extreme frequency of unsuspected prostatic tuberculosis. We have previously reported on the effects of trauma toward the dissemination of tuberculosis, resulting in miliary disease and tuberculous meningitis as terminal events. It should be mentioned that such disseminations of tuberculosis from urinary and genital tract foci have been diminished by (1) nontraumatic nephrectomies for renal tuberculosis, and (2) epididymectomy or scrotal protection in cases of tuberculosis of the epididymis.

Injuries to the Kidney, Ureter, and Bladder

IN MOST instances of direct trauma involving the kidneys, ureter, and bladder, the causal relationship is obvious, being frequently corroborated by emergency surgical intervention. However, it is useful to ascertain as closely as possible the exact condition of the urinary tract before injury. Such complications as pre-existing hydronephrosis, chronic nephritis, chronic pyelitis, evidence of nephrosclerosis, or vesical neck obstructions should be noted, because similar complications may occur as a result of injury. Although trauma to the already damaged kidney or bladder is compensable, the expected return toward normal is obviously not as great as in a previously undiseased organ.

In the patients, treated by conservative or nonoperative methods, where the trauma does not necessitate surgical intervention, one finds the greatest difficulties in establishing the amount of disability. Small lacerations of the kidney may not be noticeable on pyelography; no immediate source of a hematuria following trauma may be found; and perirenal hematoma may at first resemble perinephric abscess in some respects, but with subsequent resolution. These conditions and similar ones require no immediate surgery and are recognized only by some of their sequelae—hydronephrosis due to obstruction, nephroptosis, tumors, calculi, tuberculosis, renal cysts, scars resembling infarcts, or atrophy due to interference with the renal blood supply. Such examples serve to emphasize the value of a complete urologic work-up and the significance of thorough clinical, laboratory, and roentgenographic records. Although some urologists feel that every kidney injury should be treated surgically, we believe that unless an emergency exists, a majority do not warrant surgical intervention. In view of more recent experimental studies by Goldblatt, Page, and Harrison, the patients in whom trauma is suspected to have caused extra or intrarenal hemorrhage should be carefully observed for six to 18 months. During this period most of the perirenal and intrarenal fibrosis (with resulting ischemia) will take place. This would explain subsequent occurrence of a hypertension similar to that produced experimentally by means of a cellophane perinephritis.

AGGRAVATION: We mention at this point the subject being given considerable attention by medicolegal boards, compensation by reason of aggravation. It cannot be refuted that trauma may cause exacerbation of disease already present, or that an injury may create a "locus minoris resistentiae," favoring migration of organisms to the contused area. Such occurrences have been noted in all portions of the genitourinary tract, the testicles, the prostate, the bladder, and the kidneys. It is generally considered by the various boards that compensation is justified, but not to the full extent that is given to those cases where a major part of the disease is attributed to the injury. The complicated features of determining compensability in urologic disease are well illustrated in the following case reports:

CASE I. P.C. A white male, 28 years of age, developed severe lumbar backache while doing heavy lifting five years ago. He was unable to work for a year, and went from physician to physician, being considered a case of "back strain" by some, and as a malingerer by others. He was observed by insurance company physicians and received compensation for about a year. Finally, a diagnosis of tuberculosis of the spine was made and a spine fusion was performed. During his convalescence, he developed urinary symptoms. A diagnosis of right renal tuberculosis was made and a right nephrectomy performed. There was a persistent post-nephrectomy tuberculous sinus and the man was transferred to Sea View hospital. Lipiodal studies of the sinus tract were made, during which time, the patient was seized with a severe episode of coughing. Roentgenograms revealed the sinus tract continuing from the right nephrectomy scar across the midline through the left side of the diaphragm, to communicate with the bronchus of the left lower lobe. By use of ether and mild silver irrigations, the sinus tract was healed completely. In the interim, the patient developed evidence of tuberculosis of both epididymides for which epididymectomies were performed. A complication of his disease was a severe amyloidosis as noted by the Congo red test. Not only was there 100% absorption, but also the control four-minute specimen was extremely light colored. This man has been discharged without any subjective complaints, has gained weight and appears to be in good health. However the Congo red absorption remains at 100% quantitatively.

COMMENT: Is this case compensable? A four-year history since injury. During the first year, roentgenograms showed no change, but subsequently showed vertebral tuberculosis at the site of injury. This was followed by a tuberculous kidney, a nephro-bronchial fistula, epididymitis, and amyloidosis. The factor of injury was present, but undoubtedly did not introduce the infection. Either a definite change in susceptibility of the spine was created (locus minoris resistentiae) or a factor of hypersensitivity existed. The referee decided against the claimant.

CASE II. J.P. A white male, barber, 38 years of age, developed pain in his right hand and wrist while at work. Examination revealed tuberculosis of the metacarpals. A fusion operation was performed at Sea View hospital. During convalescence, tuberculosis of the epididymis occurred for which epididymectomy was performed. During one period, his urine contained tubercle bacilli. This finding receded, and repeated subsequent cystoscopic and pyleographic studies gave no evidence of renal involvement.

COMMENT: This man received full compensation for his illness of both orthopedic and genital disease on the basis of aggravation due to his work.

CASE III. R.S. White male, helper, age 35, fell about six feet from a truck. Slight pain in the right side of the back became very severe a few hours later, with hematuria and temperature elevation. The patient was hospitalized. A urologist made a diagnosis of calculus impacted at the uretero-pelvic junction. At time of the cystoscopic examination, the calculus was pushed back into renal pelvis, with immediate disappearance of all symptoms. A few days later, with the patient symptom-free, the surgeon advised pyelectomy inasmuch as the calculus appeared too large to pass down the ureter.

COMMENT: It was our opinion that the fall from the truck probably dislodged the calculus and caused it to engage at the uretero-pelvic junction. The hospitalization and immediate disability were therefore compensable. After the urologist pushed the calculus back into the kidney pelvis—its position prior to the accident—further care of the patient was no longer up to the carrier. Surgery or further cystoscopic care then became a private agreement between the patient and the attending physician.

CASE IV. S.K. White male, age 34, shoe salesman, developed a right epididymo-orchitis. He attributed the swelling to straining while putting shoe boxes on a shelf a few days prior to the onset. There was no history of a direct blow, and no evidence of gonorrheal or tuberculous infection. The Wassermann test was negative. A careful history revealed the practice of coitus interruptus over a period of years. The patient had severely infected teeth. Palpable and laboratory evidence of a non-specific prostato-vesiculitis were found.

COMMENT: This patient honestly believed his "swollen testicle" was caused by straining while at work. Painstaking history and examination revealed the fact that the "injury" was in reality a non-compensable "disease" secondary to focal infection and unwise sexual practice.

CASE V. A. R. White male, age 40, longshoreman, complained of backache and attributed it to lifting. Orthopedic examination revealed no disease. The prostate was thickened by a periprostatitis and was very tender. The vesicles were engorged and extremely painful to the slightest touch. Examination of the secretion showed numerous clumps of pus cells.

COMMENT: After a few diathermy treatments to the prostate and seminal vesicles, followed by massage, all symptoms were eliminated. The claimant was satisfied that his backache was due to a residual prostato-vesiculitis resulting from self treatment of gonorrhea 12 years previously under the guidance of a druggist friend.

CASE VI. An illustrative case is that of a 53 year old white man, a painter, who fell from a ladder, and developed gross hematuria. He was sent to a urologist for cystoscopic examination, giving a history of having had no previous urinary symptoms. Cystoscopy revealed a large bleeding bladder tumor. The urologist controlled bleeding by transurethral electrocoagulation and took a specimen for biopsy at the same time. The pathologist reported carcinoma of the bladder. The tumor was inoperable, and radon seeds were implanted cystoscopically. We saw the patient in consultation and confirmed presence of the tumor by cystoscopic examination with his private urologist.

COMMENT: Since the hematuria was of traumatic origin, the control of bleeding was definitely the carrier's responsibility. We advised the company to compensate the patient and his physicians for the period of bleeding and the return to a non-bleeding "normal" state. Nevertheless, we suggested that this case be brought before the compensation commissioner, where both the opinions of his private urologist and of ourselves were given that the tumor was definitely present before the accident; that the control of bleeding had brought him back to a previously asymptomatic status, and that the further treatment would have no relation to the injury. In fact, in this case the patient was fortunate that his fall led to a diagnosis. The importance of obtaining the referee's ruling for such a claim, even though settled by the carrier, is the danger that progression of the malignancy would subsequently give the carrier a "fatal" case to combat during the next year or two. In such cases, the urologist's responsibility is not only to protect the patient during the present "aggravation" of disease, but also to protect the carrier against future claims for which he is not liable.

CASE VIII. J.M., a 22 year old white male, pushed some plaster boards with his abdomen for a short distance while at work one afternoon, but did not recall any direct injury or over exertion and continued to work for the rest of the day. He noted a painful scrotal swelling that evening. He did not mention it to anyone, and went to his private physician only when the testicle began to enlarge, a month later. Conservative therapy was instituted; however, a fistula formed in the scrotum, and the man was hospitalized. We saw him in consultation and confirmed the diagnosis of tuberculous right epididymitis. He also had a tuberculous right vasitis; and a typically tuberculous prostate.

We again examined this patient in consultation after a right orchidectomy had been performed. He applied for compensation. We do not believe there can be any causal relationship between pushing boards with the abdomen and the tuberculous epididymitis. Genital tuberculosis is always secondary to tuberculosis elsewhere and is only a manifestation of a general disease. There was no history of trauma. We believed that the carrier was justified in contesting this claim; otherwise being open to future claims when other foci of tuberculosis may flare-up. The referee upheld our contention.

Summary

IMPORTANCE of an early unbiased history in compensation injuries is stressed.

2. Urological survey must embrace a thorough physical examination often with cystoscopic, pyelographic, and laboratory data.

3. A direct injury is the only cause of traumatic epididymo-orchitis.

4. Non-specific prostato-vesiculitis is the most frequent cause of these so-called cases of "traumatic" epididymo-orchitis. These are not compensable.

5. Trauma and tuberculosis are discussed.

6. The theory of aggravation is discussed and illustrated in several cases.

7. The relationship of bladder tumor and renal calculi to trauma is illustrated with case presentations.

8. Infection in the prostate and seminal vesicles is a common cause of non-compensable low back pain.

Discussion

DR. MORGAN: In regard to the scrotal tumefactions, great importance is to be placed upon the time element between the alleged accident and the onset of the swelling. Epididymitis, the most frequent cause of scrotal swelling, usually gives the stereotyped story of no direct trauma but of straining, feeling a snap in the region of the groin with advent of testicular swelling two to four days later. These cases almost always show a prostato-vesiculitis or pyuria from upper urinary infection or both. Every examination of epididymitis should include a prostatic culture. Disability incident to epididymitis has been greatly shortened by the advent of chemotherapy. I, too, am of the opinion that indirect muscular strain is not a competent-producing cause of epididymitis but that the epididymitis is an extension of the genito-urinary infection. Frequently torsion of the testicle has been mistaken for and treated as epididymo-orchitis. I have seen three cases in the last year in which there was long disability, much suffering and the end result, extreme atrophy of the affected testicle. The importance of the immediate disabling pain with swelling appearing within a few hours after the accident should place the examining physician on his guard that he is dealing with a torsion rather than an epididymitis.

All obscure back cases, in addition to having the prostatic secretion examined, as advised by the Drs. Green-

berger should undergo an intravenous urographic examination to rule out obstructive upper urinary pathology, usually congenital in type. May I sound a note of warning about immediate instrumentation of cases which are complaining of burning and frequency of urination with no urinary findings? Frequently these symptoms are caused by an anxiety neurosis and instrumentation may place these symptoms on an organic rather than functional basis.

One very important factor, which has come to my attention forcibly on three occasions in the last few months, is the question of orthopedic stones. We all know that long periods of complete immobilization cause an osteoporosis with mobilization of calcium in the blood stream and this pre-disposes to stone formation. In two of the last three cases that I have seen x-rays taken at the time of the accident included the kidney areas and were negative for any renal calculi. Many months later when hematuria and kidney colic ensued, investigation showed the presence of a very large stone. In these two cases it had to be accepted as a sequelæ to the incapacitating injury.

DR. M. E. GREENBERGER: This discussion emphasizes the important features which urologists should keep in mind in management of compensation problems. Most of the cases are settled by the carriers. The referees see only a small number of these cases and since each case varies, they have no uniform standards which to follow in giving their decisions. Therefore, we are collecting rulings and opinions in a complete series of urologic problems for publication in the near future.

Dust Problems in Industry

—As Related to the Coroner—

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A CONSIDERABLE number of surveys in industry have shown that exposure to dust occurs many more times than industrial exposures to any other injurious substances. From our point of view, however, it is particularly important to point out that there are only two types of dusts which produce disease, namely free silica dust and asbestos dust, and there are only two diseases clinically recognizable as due to dust exposures, silicosis and asbestosis. Clearly then, our discussion is limited to the pathology of these two diseases.

The coroner as a pathologist deals with the end results of disease, as shown by the autopsy findings. He is, therefore, primarily interested in the pathological conditions characteristic of the two dust diseases before mentioned, silicosis and asbestosis. There may, however, be a combination of silicosis and tuberculosis, in which case he is also interested in the pathological changes produced by the combination. We shall restrict our discussion to a very brief reference to the characteristic pathological changes in the two dust diseases mentioned and then give several illustrative case histories, which show how the coroner may help in these problems.

Rather than take the time to give a lengthy pathological description of silicosis and asbestosis changes, brief reference will be made to classical descriptions in the literature, which can be read at leisure. Probably the latest and best of these occurs in the volume entitled "Silicosis and Asbestosis," by various authors and edited by Dr. A. J. Lanza, published by the Oxford University Press, 1938. Here there are detailed descriptions by Dr. S. Roodhouse Gloyne, Pathologist of the Pathological Laboratories and Research Institute, London Chest Hospital, and Dr. Leroy U. Gardner, Director of the Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, New York. With respect to silicosis, especial attention is paid to descriptions of the characteristic lesion, the silicotic nodule, whereas with reference to asbestosis, the material treats very largely of the microscopic changes in the lungs, the asbestos fibers, and the so-called asbestosis bodies. Excellent descriptions are given, both of macroscopic and microscopic findings.

The diagnostic criteria for silicosis include an industrial exposure to free silica dust of sufficient amount, over a considerable period of time sufficient to produce the characteristic lesions of the disease, silicotic nodules, which are distinguishable in x-ray films of the chest, as well as by necropsy. Physical findings are not characteristic and are, therefore, worth little in diagnosis.

The same procedures in diagnosis are important in asbestosis, although the clinical findings are somewhat more characteristic, but may not be so in certain cases.

Perhaps there is no better way to show what has been taking place than to give several case histories which will demonstrate how errors have been made and point out how the coroner may be of great help in these problems. These histories will be supplemented by pathological findings, so that the end results can be clearly understood.

Case Histories

CASE I was that of a 38 year old fireman in a power plant of a pottery. There was no accurate or definite information with regard to his occupational exposure, although it is known that the usual occupational exposures of a stationary fireman are dry heat, sudden changes of temperature, inorganic dust, and carbon monoxide.

Briefly summarized, the clinical findings showed pyorrhea, infected tonsils, chronic heart and kidney disease, with edema of the legs. The electrocardigram was negative.

This man died September 12, 1939, and the death certificate was signed September 13, 1939, the cause of death being stated as tricuspid regurgitation, with cardiac failure; contributory causes were named as pneumoconiosis with emphysema of the lungs. The clinician also made the statement on the death certificate that the disease was probably related to the occupation of the deceased, as he had worked in a pottery.

Subsequently the body was exhumed for autopsy. The autopsy surgeon reported as one of the most prominent features a marked enlargement of the pericardium. Although there was no fluid found, it was believed from the appearance of the sac that a definite effusion had been present at the time of death. Both layers of the pericardium were covered with a typical exudate of fibrin, with loose adhesions which were fairly easily broken when the heart was removed. The heart was enlarged to about three times its normal size and the musculature of the right and left ventricles was much thicker than normal. No vegetative lesions were shown on the walls of the heart. The valves were all normal with the exception of the mitral which showed a marked thickening and less of elasticity with shortening of the chordae tendinae. Anatomical inspection led to the conclusion that this was a definite mitral stenosis.

The aortic lining showed small areas of cholesterol deposits under the intima.

The lungs were free in the thoracic cavity, no adhesions being present. They were soft and crepitant and contained air throughout. There were no abscesses, pneumonia, cavitation, calcification or other evidence of disease. They were black in color due to anthracotic pigmentation.

The abdominal viscera occupied the normal relationships and showed no gross changes.

The right kidney showed a marked diminution in size, but the capsule stripped easily, leaving an irregular cortical surface. Upon splitting the kidney the medullary and cortical areas seemed fairly blended together and the cortex

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was thinner than normal. The left kidney was considerably smaller than the right, but no other abnormalities were noted.

The anatomical diagnosis at autopsy on the gross findings was (1) Pericardial effusion; (2) acute fibrinous pericarditis; (3) chronic cardiac hypertrophy; (4) mitral stenosis; (5) generalized arteriosclerosis; (6) chronic interstitial nephritis.

Subsequent to the autopsy a consultant reported on the chemical findings, obtained after ashing of the lungs and analyzing for silicon dioxide. In the opinion of the consultant, it was clearly a case of silicosis.

Microscopic examination showed that the pericardium was greatly thickened and there was a loose fibrinous layer over the epicardium that was beginning to organize. In the kidney tissue, about 80% of the glomeruli were markedly fibrotic. There was a considerable number of the instances where there were small knots of fibrous tissue in the glomeruli and the rest were becoming progressively fibrotic. The tubules contained many hyaline casts and the interstitial tissue was edematous but not markedly fibrotic.

Careful study of six sections of the lungs revealed slight emphysema in a few places and there was a little brown pigment in the alveoli and in the walls, but not enough to suggest disease. The other tissues contained nothing remarkable.

The final diagnosis was an acute pericarditis which was the direct cause of death, with a background of old glomerulonephritis and chronic heart disease.

CASE II was that of a caster in a pottery, 41 years of age, who had spent the last 16 years at the occupation named.

The clinical findings as of September 23, 1939, showed a history of complaint of pain in the right chest for several years, beginning to be severe about a month before. There was cough, and huge quantities of purulent sputum. The patient had lost about 15 pounds previous to September, 1939 (in about six months) and occasionally spat up quantities of blood-stained sputum. Physical examination showed chronic rhinitis, chronic hypertrophic tonsillitis, and general dullness to percussion over both lung fields. The man seemed acutely ill, his temperature being 100°. The urine examination was normal, and the Kahn test was negative. Repeated examinations of the sputum were negative for tubercle bacilli. The tuberculin test was positive and on this basis an x-ray of the chest was advised by the clinician.

Stereoroentgenograms of the chest in October, 1939, showed the upper portion of the right lung partially collapsed. Below this there was consolidated area in the region of the second and third ribs anteriorally, and two rounded shadows of increased density approximately a centimeter and a half in diameter. The heart shadow seemed slightly displaced to the left without any other change. Approximately the upper half of the left lung was occupied by soft shadows in which one could distinguish linear markings and between these what might be called a mottled appearance. No silicotic nodulations were observed in either lung field. The diaphragmatic shadows were normal in appearance. It was concluded from these changes that this condition was either a tuberculosis with cavitation in the right lung or a non-specific infection in the right lung with abscess formation. There was no roentgen evidence of silicosis.

Death occurred December 4, 1939. The clinician signed the death certificate stating that the principal causes of death were silico-tuberculosis and right empyema. No contributory causes were mentioned. It was stated that the disease was related to the occupation because of exposure to dust, the occupation being gives as caster in a pottery.

Before mentioning the autopsy findings, it might be well to note the occupation of the patient in this case. There had been no industrial hygiene survey made, which could have provided definite information. However, it is known that this type of occupation has at various times afforded a definite silicosis hazard. Therefore the clinician presumed that this man was exposed to a hazard sufficient to produce the disease, without having adequate findings as a basis for this presumption.

Autopsy was performed on the day of death by the clinician who had attended the patient in life. The source of pathology was immediately found upon opening the thoracic cavity when a very strong colon bacillus odor was noted. The diaphragm was adherent to the pericardium. Three thousand cc. of foul-smelling, rather thick yellow exudate were removed from the right thorax, disclosing a deposit of thick fibrin on the lateral surface of the lung which was collapsed against the mediastinum and bound by dense adhesions. It was not possible to say whether a bronchopleural fistula had existed. The left thoracic cavity did not contain any free fluid and the left lung showed no adhesions.

Both lungs were removed, the right with considerable difficulty. The right lung was dense and rather solid, with a dark blackish-red color. There was considerable amount of pus expressed from the bronchus. The left lung showed marked anthracotic deposit and was almost completely black in color. No pneumonia could be found by gross inspection. There was a small abscess in the apex of the left lung. The heart was apparently normal, as were also the organs in the abdominal cavity. The anatomical diagnosis was silico-tuberculosis and empyema of the right thorax. Specimens of the heart and lungs were taken for microscopic analysis.

Subsequent gross examination of the heart and lungs disclosed the fact that the greatest portion of the upper lobe of the right lung was missing, it apparently having been dissolved or eaten away by some process. There was a heavy thick layer of fibrin and fibrous material over the remainder of the right lung. The middle and lower lobes of the right lung and the entire left lung were black in color due to carbon deposits.

Microscopic examination of a considerable number of sections of lung tissue showed no indication of a tuberculous process and no indication of silicotic lesions. Typical nodulation was observed in one lymph gland, taken from the tracheo-bronchial group. Other pathological evidence pointed to a non-specific type of infection which had caused necrosis and solution of the cellular elements of the right lung in various places and a deposit of an extensive fibrin material, as shown in the sections. There was also evidence of the action of dust in scattered places throughout the sections, as shown by an accumulation of dust phagocytes.

The chemical analysis for free silica of lung tissue showed an average of 3.63%, and by x-ray diffraction the pattern was comparable to those which contain from three to five milligrams per gram of dried lung tissue.

It was concluded as a result of the pathological findings that there was no evidence of tuberculosis and no evidence of silicosis of the lungs proper, although there was one lymph gland showing typical silicotic nodulation. There was without question an amount of free silica as shown by x-ray diffraction analysis which would be appraised as detrimental. The cause of death was stated to be a pleurisy with purulent effusion, on the right side. Associated was complete atelectasis of the whole right lung and pulmonary abscesses.

CASE III was that of a 55 year old kiln placer in a china factory.

Clinical examination approximately three and a half months before death elicited a complaint of weakness and shortness of breath for a period of about a year, with cough. Shortness of breath was so pronounced that the patient could not lie flat comfortably. There had been symptoms referable to the heart for about a year previously, and he had also spent almost a month in the hospital on account of this difficulty three months previous to the clinical examination.

The physical findings showed a man 5 ft. 8 in. in height, weight 159 pounds. The blood pressure was 190/100, temperature 97.8, pulse 100 and irregular. The teeth were carious and the tonsils showed some infection. Chest expansion was limited to one inch. There was an occasional scattered rale over the chest. There was some fibrillation of the heart noticed on chest examination. The liver was not enlarged. The electrocardiogram showed only the rhythm disturbance previously mentioned. The clinician stated that the x-ray findings showed a rather advanced bilateral silicosis.

The laboratory findings disclosed a urine containing a very faint trace of albumen and a specific gravity of 1.014, the microscopic showing a very occasional epithelial cell. The Kline and Kahn blood tests were negative. Blood sedimentation test was 14 mm. in 60 minutes, indicating normal to very slight activity. The blood count showed hemoglobin of 82% by Sahli, red cells 5,080,000, white cells 7,100, polys. 61%, and the lymphocytes 29%, mononuclears 7%, and eosinophils 3%. The vital capacity was 2600 cc. Sputum was negative for tubercle bacilli.

The clinician's opinion was that it was difficult to evaluate the heart findings. He believed that the heart condition could result from the prolonged strain placed upon the heart in a case of silicosis. On the other hand, he stated that the rhythm disturbance exists in many people for years without apparent cause and without them being aware of it. His final opinion was that the heart condition did not contribute in any significant degree to the disability of the patient.

The patient died January 24, 1941, the autopsy being performed on the same day. There was considerable pallor and noticeable loss of subcutaneous fat. The abdomen was distended and there was mild scrotal edema and marked ankle edema.

When the thorax was opened, the lungs lay free and were bathed in approximately 60 cc. of serous fluid in each pleural space. The substernal glands were enlarged, edematous, black and indurated. There was bullous emphysema at both apices. There were also broad, retracted, healed scars at both apices and both upper lobes were solidly indurated. The periphery of all lobes was palpably nodular. The nodules were beadlike and varied from 1 to 3 mm. All lung surfaces were glistening and cut with gritty resistance, being mottled and scarred. Nodules were more profuse in the periphery. The peritracheal lymph nodes were solid, black and indurated. The bronchial mucosa was smooth and mildly hyperemic. The heart was moderately enlarged and lay free in the pericardial sac. The myocardium was thickened. The valves were smooth. Coronary arteries were patent and showed no sclerosis or thrombosis. The ascending arch of the aorta showed some atheromatous plaques. The descending aorta showed some moderate calcification. The liver, gall-bladder, prostate gland and urinary bladder were all normal.

The spleen was slightly larger than usual and contained a small hyalinized plaque 3 cms. in diameter and was adherent to the diaphragm. The entire gastro-intestinal tract was normal except for slight hyperemia of the mucosa. The kidneys were smaller than usual. The cortex and the medulla were grossly normal and the capsules stripped easily. There was increased yellow fat in the pelves.

The brain was of normal size and shape and not adherent. There was an area of cystic degeneration in the left cerebral hemisphere posteriorally which measured 3 cms. in diameter. There was a similar smaller area in the left lobe of the cerebellum. There was no gross edema, no signs of recent hemorrhage, no adhesions.

Microscopic examination of several sections of the lungs showed essentially the same histological changes, marked nodular fibrosis with irregular branching strands of fibrous tissue with deposition of dense black pigment substance, almost complete obliteration of the alveolar network and distortion of that which remained. There were also focal collections of lymphocytes and the small arteries showed proliferation of the connective tissue of the media.

A section of the aorta showed some increase in the adventitial connective tissue. The medial layer showed numerous linear vacuolated spaces. The intimal layer was irregular, broken, and appeared to be a fragmented line? It also revealed some focal thickening and fibrosis with round cell infiltration and several large irregular defects filled with blue stained calcium. There were other subintimal calcium deposits.

Sections of the myocardium disclosed a fairly well preserved musculature with some slight increase in the connective tissue around nutrient blood vessels and between muscle bands.

Sections of the spleen showed some hyperemia and engorgement of the blood vessels. At one edge of the spleen there was a broad band of hyalinized connective tissue. The adjacent portion of the spleen, proximal to its base, contained a moderate red cell infiltration and some irregular bands of connective tissue. This suggested an old area of infarction, but there were no signs of recent reaction.

Several sections taken from the lesions of the cerebrum and cerebellum showed essentially the same histological changes, that is, large areas of degeneration primarily cystic. The broader areas showed marked gliosis, while the central portions showed numerous focal collections of red cells, blood pigment and scavenger cells. There were many lymphocytes noted throughout; and in the area of gliosis there were many newly formed small blood vessels. The pathological picture here was that of an old hemorrhage with cystic degeneration and attempts at gliosis.

The anatomical diagnosis was as follows: (1) advanced silicosis of the lungs; (2) pulmonary edema; (3) pulmonary emphysema; (4) bilateral hydrothorax; (5) chronic myocarditis with moderate hypertrophy and dilatation; (6) moderate arterio-sclerosis; (7) encephalomalacia; (8) old cerebral hemorrhage; (9) focal area of hyalinization in the spleen; (10) mild passive hyperemia of all viscera; and (11) mild and early anasarca.

The death certificate was signed February 17, 1941, by the clinician who had been present at the autopsy on January 24, 1941. The principal cause of death was given as silicosis and pulmonary edema with a contributory cause being cerebral hemorrhage.

Because the actual cause of death in this case was disputed, resort was made to consultations to determine this issue. It was emphasized that the deceased had a long history of heart difficulty and had been hospitalized for almost a month on this account and that, furthermore, the history showed that he had experienced orthopnea, which is a characteristic heart symptom and not characteristic of silicosis. The physical examination findings showed definite hypertension with fibrillation. The laboratory findings showed absence of a systemic infection, nor was there any evidence of systemic infection in the lungs either in the clinical or pathological findings. It was agreed, however, that there was ample evidence at autopsy of advanced silicosis, but that there was no evidence of an associated infection which really produces death. It was decided, therefore, that deceased met his death because of a cardiovascular condition which had been going on for some time, producing brain changes primarily responsible for his demise, resulting finally in a cerebral embolus because of brain softening. It was especially emphasized that, in order to cause death as a primary factor, there must be some form of infection associated with the silicosis, such as tuberculosis, pneumonia or bronchopneumonia.

Discussion

HERE, then, are three instances of where the death certificates were signed erroneously, ascribing death to silicosis or silico-tuberculosis. As Greenburg stated, at the Symposium on Tuberculosis in Industry, at Saranac Lake, in June, 1941: Experiences with data from death certificates indicate a high rate of mortality from respiratory diseases — but one must look beyond the certificate for the actual cause of death.

In recapitulation, the outstanding points in the three case types may now be summarized and comments made.

Case 1 was an individual whose occupation afforded no silicosis hazard whatever. The clinician gave pneumoconiosis as a contributory cause of death and a consultant diagnosed silicosis on a chemical analysis of the lungs. The final diagnosis based on the autopsy findings was an acute pericarditis with a background of old glomerulonephritis and chronic heart disease.

Case 2 involved a pottery worker in an occupation which has been known to produce silicosis. Neither the stereoroentgenograms nor the autopsy findings indicated the presence of a pulmonary silicosis, although there was autopsy evidence of one silicotic nodule in a single tracheobronchial lymph gland. The final pathological diagnosis as to cause of death was stated to be a pleurisy with purulent effusion, right

side, with complete atelectasis of the whole right lung associated with pulmonary abscesses. This was true in spite of the fact that there was enough free silica in the lungs, as shown by x-ray diffraction test, to have produced silicosis.

Case 3 was that of an individual whose occupational history gave no information concerning a silicosis hazard. Both x-ray and autopsy findings showed an advanced silicosis, however, without any evidence of a superimposed infection of the lungs. The actual cause of death based on all findings was concluded to be cardiovascular disease, old areas of brain softening with previous cerebral hemorrhages finally resulting in a cerebral embolus.

It is important to point out here that a diagnosis of silicosis must be predicated upon definite clinical findings, particularly characteristic lesions as shown by x-ray films of the chest; that it is quite impossible to make a diagnosis of silicosis because of an increased or abnormal amount of the free silica content of ashed lung tissue, either by chemical means (the accuracy of which is quite doubtful) or by an x-ray diffraction test, the accuracy of which is beyond dispute. As Gardner has repeatedly said, it is necessary, just as in any other disease, to find the characteristic lesions of silicosis, in order to make a correct anatomic diagnosis. This does not mean that it would be impossible to make a diagnosis during life, but it does mean that the autopsy findings must show characteristic changes.

It is furthermore important to use correct terminology. Pneumoconiosis, for instance, is a blanket term and certainly should not be used in autopsy findings, because of the fact that there are only two of the so-called pneumoconioses which are diseases — silicosis and asbestosis, as previously mentioned. The other pneumoconioses produce non-characteristic and non-specific changes, which are no more diseases, as Gardner has said, than are calluses on the hands.

The simple suggestions which have been pointed out here will help a great deal in assembling proper mortality statistics with reference to the two dust diseases, silicosis and asbestosis. It is impossible at the present time to place any reliance upon the mortality statistics with reference to these diseases, as taken from death certificates, because of the kind of errors mentioned, and because of practices which are not consistent with scientific medicine.

In conclusion, the coroner in his role of pathologist, and associated with other pathologists, can do a great deal to promote the use of specific terminology and proper diagnostic deductions at autopsy, thereby being of great assistance to clinicians, in insisting that death certificates wherever possible at least, be signed in strict accordance with the autopsy findings.

Industrial Health Congress Highlights

Hazards in Small Plants

IT IS the general belief that the hazards of industrial poisons are present chiefly in the large companies and seldom in the small ones. There is, however, good reason to believe that the individual worker in the small plant is exposed to more hazards or to the same hazards in more ways than the man in the large plant.

The difficulties of attempting to establish industrial health programs in small plants are characteristic of the manner in which science has outstripped the advancement of social and professional organization which would make possible the fullest utilization of our knowledge.

—From "Report of the Council on Industrial Health," by STANLEY J. SEEGER, M.D., Council Chairman; *J.A.M.A.*, February 21, 1942.

Dental Services

A STUDY recently made to determine how many industries operate dental services revealed that, out of 841 industries listed by the American College of Surgeons and to which questionnaires were sent, 498, or 59%, replied. Of these 116, or 23.3% (13.8% of the whole number), reported having a dental service. About one company in 10 employing more than 500 people and having an approved medical service maintains any dental service whatever. Forty-two per cent of the dental services are in plants in the Eastern states, 37% in the middle west and 21% in the southern and western states and Canada.

—From "A Dental Program for Industry," by R. M. WALLIS, D.D.S.; *J.A.M.A.*, February 21, 1942.

Clinical Clerkship

IN THE Medical College of Virginia the clinical clerkship in industrial health consists of two weeks spent in a chemical plant employing between 3500 and 4000 workers, in which there are five full time physicians and eight nurses in the medical department. Another two weeks is spent in another plant of the same company with entirely different chemical hazards and problems. The second plant has seven full time physicians and 12 nurses for 7000 employees. Two days out of this second two weeks are spent visiting the headquarters organization of this industry. Another day is spent in the toxicologic research laboratory. The students work with the doctors, watch pre-employment examinations, see the patients who come in for inspection or advice and read roentgenograms that are taken of the employees as if working in a clinic in an outpatient department. Required readings on industrial health, occupational diseases, compensation laws and plans for giving better health services to small plants are assigned. These are discussed with the student during his course or at its completion.

—From "The Industrial Clinical Clerkship," by FRED J. WAMPLER, M.D.; *J.A.M.A.*, February 21, 1942.

Health Education

MEASUREMENT of results is certain to be quite difficult of application to industrial groups. Metropolitan Life Insurance Company, after more than 30 years of experience, has come to the conclusion that its health education results are both measurable and favorable. It may be none too early for business executives, plant supervisors and industrial medical and nursing personnel to set up cooperative plans for the final evaluation of their health education programs in terms of results.

—From "Health Education for Industrial Workers," by LEVERETT D. BRISTOL, M.D.; *J.A.M.A.*, February 21, 1942.

In Connecticut

QUESTIONNAIRE data . . . . indicated . . . . that in the plants employing full-time industrial physicians there were an average of 2,204 workers per doctor. If this is accepted as the minimum justifying employment of a full-time medical service, there should be 14 additional full-time industrial physicians employed in plants in the state. It was concluded also that 12 additional plants should provide part-time service. . . . Within the last eight months the executive secretary of the state medical society has placed about 20 full-time doctors in the larger establishments.

—From "Conservation of Man Power in Connecticut," by CLIFFORD KUH, M.D.; *J.A.M.A.*, February 21, 1942.

Up to the Doctors

IT HAS been my hope that the medical profession would not show that same lack of vision in industrial health that it showed with regard to the public health movement. At the beginning of the century there was created a huge demand for health officers that the medical profession was not ready to supply. Doctors everywhere accepted these jobs and largely discredited the movement in the beginning. The Rockefeller Foundation had to create schools of public health to provide teachers and to put the public health movement on a preventive basis. In industrial medicine we shall be able to avoid this mistake if we show the necessary vision. We can educate management in a short while to demand good industrial medical service, but the program cannot be pushed too hard because qualified doctors are not available to take these places. The

medical profession, therefore, is losing a great opportunity for profitable employment. By others in the so-called social groups, it is forced into a subordinate position. The educational attainments of the physician should put him in the position of leadership. We can adequately meet the demand when we start some schools of industrial hygiene. A committee of the American Public Health Association has been at work on a suitable curriculum for some years. It is desirable to bring some concept of industrial medicine into the mind of the medical student, but at the most he cannot be taught very much. He cannot be taught enough to give the kind of service that industry has a right to expect. Industry feels that it should not teach doctors their business, but that they should be able to find ways and means of doing that themselves.

—From discussion by VICTOR G. HEISER, *J.A.M.A.*, February 21, 1942.

Mutual Benefit Associations

EFFICIENT, adequate medical and surgical care to the satisfaction of patient and physician alike are provided under the mutual benefit associations. My experiences as medical director at the Dunn & McCarthy shoe factory, extending over a period of 25 years, pointed the way to working out the various other mutual benefit associations. The total average annual cost per member for medical services at the Dunn & McCarthy shoe factory during 19 years was $17.05 for an almost complete medical coverage. At present every employee of Dunn & McCarthy is eligible to membership after having worked for the company one month. Members must actually pay dues for a period of two months before they are entitled to any benefits, six months to be eligible for hospitalization and operation, eye examinations, x-ray and extraction of teeth and one year before receiving sick benefits when operated on. Benefits are paid in case of illness, quarantine or accidents occurring outside the factory beginning with the second full week of illness. In case of accidents which occur in the factory, benefits are paid for only the first week of disability. No member can draw more than 10 weeks' sick benefits in any one year, and not more than $350 can be spent on any member in one year.

Following our success at the Dunn & McCarthy plant, associations were set up at the Agfa Ansco Division of the General Aniline & Film Corporation, Cary & Company (manufacturers of children's clothing), Spaulding Bakeries Incorporated, Truitt Brothers (shoe manufacturers), the Binghamton Die & Machine Company, the Ozalid Products Division of the General Aniline & Film Corporation and the Gotham Shoe Manufacturing Company.

It was with the Spaulding association that we elected to try a new departure in industrial medicine by giving the employees the privilege of choosing their own physicians. This new system was successful at Spaulding's Binghamton plant. It was then extended to the Elmira and Oneonta plants in 1934, the Wilkes-Barre plant in 1935 and the Middletown plant in 1936. I believe that when the Spaulding employees were allowed complete freedom in the choice of physicians this was the first time such privilege had been granted by any organization.

In each of the Spaulding mutual benefit associations (Binghamton, Elmira, Oneonta, Wilkes-Barre and Middletown) the setup is essentially the same. Major and minor operations, eye examinations, hospitalization for 30 days a year at $3 a day, house and office calls ($50 a year) and x-ray and extraction of teeth ($25 a year) are allowed.

Our experience indicates that with proper administration and with cooperation between the benefit associations and the local medical societies this type of service to the worker can be provided in industry on a basis of complete freedom of choice of physicians. Successful development of such mutual benefit associations depends to a large extent on low overhead, anticipation of costs and the ratio of male and female employees in the industry concerned. These plans have been in successful operation long enough to prove their feasibility and financial soundness.

—From "Medical Service for Small Industries," by MYER S. BLOOM, M.D.; *J.A.M.A.*, February 21, 1942.

New Departure's Industrial Hospital

OPERATING around the clock, it handles some 300 calls a day. Minor cuts, bruises and sprains are treated most frequently, though the cases range from malingering to compound fractures. The 14 rooms are air-and-heat conditioned, thoroughly equipped and staffed with a full-time doctor and seven trained nurses.

Such, in brief, is the model industrial hospital recently completed by the New Departure Division of General Motors in Bristol, which now has more than 6000 employees making ball bearings for Uncle Sam.

In a quarter century New Departure's medical facilities have expanded from a single room now used as the company firemens' parlor into a streamlined, glass-bricked establishment covering 6000 square feet. One slightly trained attendant has been replaced in the course of time by DR. MARTIN I. HALL as Medical Director.

Next to the reception room is a first-aid room furnished with foot and arm baths, washup sinks and a treatment table. Nearby are an operating room for minor surgery, an eye room and physiotherapy room with short-wave diathermy units, ultra-violet and infra-red lights, sterilizers, and everything else.

Three more rooms are devoted to a modern x-ray department, which includes a shock-proof x-ray machine, another mobile unit and dark-room. In addition, there are a male ward with three beds, female ward with two beds and a nurses' rest room.

Fluorescent lighting illuminates to advantage the walls painted in pastel shades and the floors covered with vari-colored linoleum and asphalt tile.

Other functions of the hospital are the treatment of accidents and illnesses incurred outside the factory (such as colds, indigestion and other common ailments), the examination of applicants for work, and the maintenance of plant hygiene.

New Departure also has a hospital in its Meriden plant under the direction of DR. ARTHUR A. TOWER which has equally complete facilities. Four nurses, a clerk and x-ray technician make up the staff.

First Aid Dressing Room, New Departure's New Industrial Hospital

From *Connecticut Industry*, January, 1942.

Pre-employment Examinations, X-Rays, Blood Tests, and Physiotherapy are Provided for by New Departure

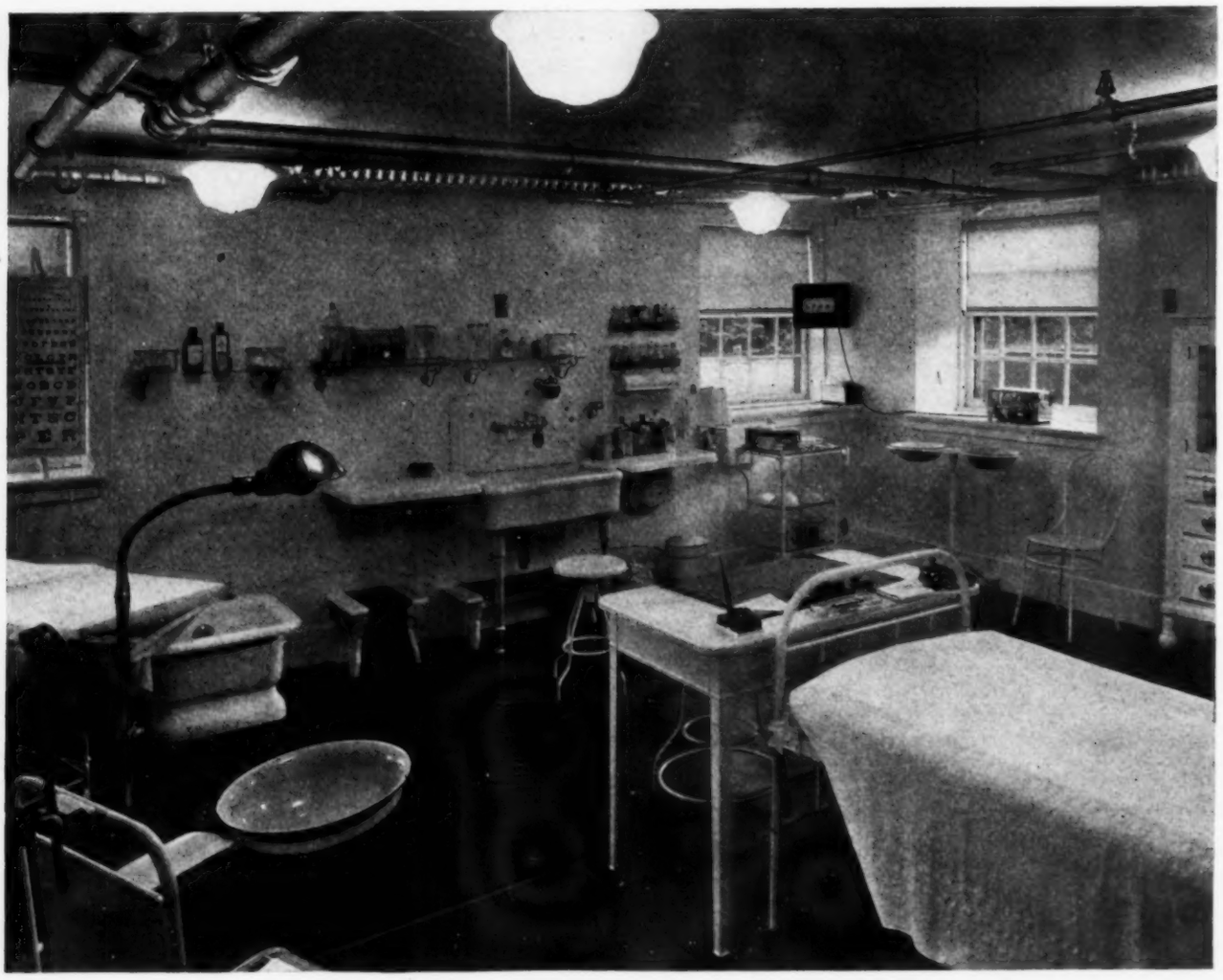
All in all, New Departure is doing its share of keeping America's industrial manpower in working trim. Unless this responsibility is assumed by every manufacturer, small and big alike, the foundation of America's war effort—production—will remain dangerously weak.

Ensign-Bickford's Medical Facilities

PICTURED below is the modern and complete medical room which the Ensign-Bickford Company has provided for the 350 employees of its Simsbury plant. This particular room has been in use some 20 years, although the company had first-aid facilities as far back as 1914.

The medical services which Ensign-Bickford provides in the double interest of employee health and uninterrupted production include a physician, who comes in five mornings a week and is otherwise on call; a nurse as assistant, loaned by the local Visiting Nurse Association; a clinic for employees and members of their immediate families which offers medical advice, diagnosis of simple ailments and some preventive treatment. The majority of key men have been trained in first-aid work, so that some one in every department is prepared to handle an emergency accident or injury. In addition to pre-employment examinations, the company requires those employees who have been absent more than one week to be re-examined before returning to work.

From *Connecticut Industry*, December, 1941.



A Corner of Ensign-Bickford's Medical Quarters

The Evaluation of Disability

PAUL B. MAGNUSON, M.D., F.A.C.S.,
Chicago

THE evaluation of disability is a thankless job. At least one and sometimes both parties to the dispute are dissatisfied. Medicine and surgery are still not exact sciences, and art in the practice of medicine still holds a pre-eminent place. Acting as medical arbitrator pre-supposes absolute fairness and unbiased judgment. In order to be in this state of mind the examiner must not feel obligated to anyone or anything except his own conscience. An open mind and a sympathetic attitude are imperative. Without an open mind the patient's complaints cannot be evaluated, because possibly some of them we have not heard before, or may not have considered how they may affect his life and his ability to work. If a sympathetic attitude is not maintained, cooperation cannot be attained. The doctor did not cause the injury but the patient may feel that somebody is responsible, and it is easy for the average individual to blame his disability on the nearest objective.

The examiner must also remember that frequently settlement of a claim is a question of barter, exchange and trading. In my experience there have been few malingerers but many exaggerators, but when the case is boiled down to a trading basis it will be found that the individual on the opposite side of the fence starts low so that he can come up, whereas the one who has been injured starts high so that he may come down. The doctor must not be caught between and have his judgment influenced by either side. He must prove to himself, so far as possible, whether the patient is or is not injured and, if injured, to what extent, not only for his own occupation but for any occupation. Most compensation laws require an estimation of disability based on inability to perform any and every kind of work, and inasmuch as the doctor does not know what is involved in any and every kind of work, any more than does the individual, he starts out with a handicap of lack of knowledge of what the law requires of him.

Justice is an extremely difficult commodity to dispense. What is one man's meat is another man's poison, and what is justice to one is injustice to another, so that the estimation of disability cannot be made on a standardized basis without regard to other circumstances pertaining to the individual case. This is without regard to what the law instructs us to do—which is impossible.

EVALUATION of Injuries of the Neck: In such cases should be considered what may happen in the cervical region which would give pain and disability, and what symptoms might be caused, objective and subjective. Neck injuries are more open to dispute than almost anything except skull fractures. Examination of the neck must take into consideration all its structures—a highly technical problem; the interpretation of the various motions of the neck; the strains put on the structures by various motions; confusion tests to differentiate assumed from real disability; referred pain and its meaning; tests for evaluating a given disability.

EVALUATION of Disability in the Back: Analysis of causes of back pain must be made, with special methods of examination to determine the extent of disability; evaluation of x-ray findings, and their relation to clinical findings; recommendation as to the return to work of a patient with a back injury, taking into consideration the age, temperament and character of the individual.

INJURIES to hip, knee, ankle, shoulder, elbow and wrist, must all be considered under the same general classifications as those above outlined.

It should be emphasized again that the examiner's attitude should be impartial and sympathetic throughout, and that his evaluation of disability in a given case should be based upon his own findings, uninfluenced by the opinions of others.

Abstract of course given before the American Academy of Orthopedic Surgeons, Atlantic City, January, 1942.

Proposed Graduate Course
Industrial Hygiene and Medicine

—Medical College of Virginia—
—Richmond—

REALIZING the importance of some special training for physicians who are going into the field of industrial medicine or, who, because of the increased demands for medical service in industry, will be taking part-time jobs in industry, the Medical College of Virginia, in cooperation with the Bureau of Industrial Hygiene of the State Health Department, the Industrial Commission of Virginia, the State Department of Education, and the medical departments of several industries in and around Richmond, offers practical intensive courses of one, two or three months' duration in industrial hygiene and medicine for physicians who wish to have a better understanding of the problems involved in industrial medicine and health. The completion of one of these courses will be evidenced by a certificate to that effect.

THE course will cover:

First, time spent with the heads of medical departments of two or more industries in and around Richmond;

Second, work with the State Health Department's bureau of industrial hygiene on a survey of an industrial plant, and in the same bureau laboratory;

Third, time with the Industrial Commission of Virginia to study their compensation set-up and problems; and,

Fourth, division of rehabilitation—special and adult education—State Department of Education;

Fifth, lectures, seminars, discussions and assigned readings on compensation laws in the different states, casualty insurance as it applies to the field of industry, morbidity and mortality reporting in industry, statistics of industrial employment and lost time from occupational and non-occupational diseases, plans for medical care for small industries, tuberculosis and syphilis control programs in industry, labor's attitude toward medical programs in industry, the attitude of employers toward medical programs, and the position of the industrial nurse in the medical program.

Emphasis in this course will be on the actual practical experience with medical directors in industry. In addition to the diseases found in these industrial establishments, disease conditions of an occupational origin in the hospitals and outpatient clinic of the Medical College of Virginia will be demonstrated.

The tuition for this course will be $50.00 for the first month, and $25.00 for each succeeding month. Since the instruction will be largely on an individual basis, it will be possible to start a student at any time after January 1, and no more than four students can be accommodated at any one time.

For further information about the course write to the Dean of the School of Medicine or the Professor of Preventive Medicine, Medical College of Virginia, Richmond, Virginia.

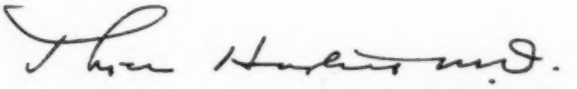
American Association of Industrial Physicians and Surgeons

Twenty-Seventh Annual Meeting—Cincinnati, Ohio, April 13-17, 1942

TO THE MEMBERS OF THE ASSOCIATION:

PROJECTED against a background of war, a new kind of mechanized warfare in which the industrial physician is a veritable field marshal in the strife, the annual meeting at Cincinnati becomes clearly the most important in the twenty-seven year history of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS. The industrial physician, surgeon, hygienist and nurse emerge in a vital new role, and are winning new recognition.

IN TURN we must assume the urgent new responsibilities which accompany recognition and trust. This challenge to our professional abilities demands our utmost efforts. And how can we better fortify ourselves than by taking advantage of the post-graduate institute of instruction which has been arranged for us at Cincinnati? Fittingly, the program for this critical year is one of the most comprehensive in our history. The caliber of the specialists who will participate affords us an opportunity for invaluable information and personal contacts. To say that we must attend this meeting is an understatement. Not only must we attend, but also we must utilize this opportunity to the fullest. Cincinnati is a challenge. I will look forward with keen pleasure to seeing you there.



PRESIDENT

Advance Program

Monday, April 13, 1942

MEDICAL CLINIC—Cincinnati General Hospital, by Staff of Department of Medicine—

1. "Hypertensive Vascular Disease in Relation to Industry"—ARTHUR FREEDMAN, M.D.
2. "Cardiovascular Syphilis in the Active Period of Life"—J. H. KOTTE, M.D.
3. "Polyneuritis—Toxic, Infectious, or Nutritional?"—MILTON ROSENBAUM, M.D.

DERMATOLOGICAL CLINIC—Cincinnati General Hospital, by LEON GOLDMAN, M.D., and Staff, Department of Dermatology.

Demonstration and Discussion of Types of Industrial Dermatoses.

SURGICAL CLINIC—Cincinnati General Hospital, Staff, Department of Surgery—

1. "Management of Head Injuries, Including Fractures of the Skull" (30 minutes)—JOSEPH EVANS, M.D.
2. "Treatment of Fractures:
   (a) About the ankle.
   (b) Supracondylar fractures, the humerus.
   (c) Compound fractures.
   (d) Selected title" (50 minutes).

—JOHN A. CALDWELL, M.D., and Associates.

3. "The Compression Treatment of Burns" (20 minutes)—VINTON E. SILER, M.D.
4. "The Bacteriologic Study of Wounds and Burns" (20 minutes)—W. A. ALTEMEIER, M.D.
5. "Use of Whole Blood and Plasma" (30 minutes)—PAUL HOXWORTH, M.D.

Tuesday, April 14, 1942

ADDRESS of Welcome—S. E. DORST, M.D., Dean College of Medicine, University of Cincinnati.

Address of Welcome—JOHN J. SKAVLEM, M.D., President, Academy of Medicine of Cincinnati.

Response—T. LYLE HAZLETT, M.D., President, A.A.I.P.&S.

Response—DONALD CUMMINGS, President, A.I.H.A.

ANNUAL MEETING—American Association, Industrial Physicians & Surgeons:

Opening Remarks—T. LYLE HAZLETT, M.D., President, A.A.I.P.&S.

"The Health of the Executive"—HAROLD C. HABEIN, M.D., Rochester, Minnesota.

"Cardiovascular Survey of Supervisors"—WILLIAM LEIGH COOK, M.D., Pittsburgh.

"Discussion of Papers by DR. HABEIN and DR. COOK"—Led by JOHNSON McGUIRE, M.D., Cincinnati, and A. J. LANZA, M.D., New York.

"The Preplacement Examination and Its Significance"—G. H. GEHRMANN, M.D., Wilmington, Delaware.

"The Periodic Health Examination and Important Findings Among Garment Workers"—LEO PRICE, M.D., New York.

PANEL CONFERENCE—"The Administration of Health Problems"—EDWARD C. HOLMBLAD, M.D., Chicago, Presiding. A panel of qualified industrial physicians will answer questions on this subject.

"Recognition of Toxic Effects upon Workmen Exposed to Toxic Materials"—JOHN FOULGER, M.D., Wilmington, Delaware.

PANEL CONFERENCE—"The Treatment of Burns"—GROVER C. PENBERTHY, M.D., Detroit, Presiding; VINTON SILER, M.D., Cincinnati, Collaborator.

"Advances in Skin Grafting"—JAMES BARRETT BROWN, M.D., St. Louis.

Discussion (with Motion Pictures)—EARL C. PADGETT, M.D., Kansas City, Kansas.

PANEL CONFERENCE—"The Treatment of the Wound in Compound Fracture"—CLAY RAY MURRAY, M.D., New York, Presiding; RALPH G. CAROTHERS, M.D., Cincinnati, Collaborator; J. ALBERT KEY, M.D., St. Louis; Collaborator; R. ARNOLD GRISWOLD, M.D., Louisville, Collaborator.

SYMPOSIUM—"Medical Service for the Small Plant"—Auditorium, Cincinnati Academy of Medicine—

1. "The Problem" (15 minutes)—ALFRED H. WHITTAKER, M.D., Detroit.
2. "The Need from the Viewpoint of Industry" (10 minutes)—ERNEST MUEHLECK, Ambler, Pennsylvania.
3. "Some Occupational Hazards that Confront the Small Plant" (15 minutes)—DONALD E. CUMMINGS, Denver.
4. "Practical Methods for Providing Adequate Medical Facilities and Service" (15 minutes)—CHARLES-FRANCIS LONG, M.D., Philadelphia.
5. "Relation of Industrial and Private Medical Service" (15 minutes)—STANLEY J. SEEGER, M.D., Texarkana, Texas.
6. Discussion led by VICTOR HEISER, M.D., New York.

Wednesday, April 15, 1942

SYMPOSIUM ON LEAD POISONING:

PART I—Medical and Engineering Methods and Results:

"Measurement of Industrial Lead Exposure by Air Analyses"—JOHN BUXELL, St. Louis.

"Measurement of Industrial Lead Exposure by Determination of Stippling of the Erythrocytes"—LESTER W. SANDERS, M.D., Cincinnati.

"Measurement of Industrial Lead Exposure by Analyses of Blood and Excreta of Workmen"—JACOB CHOLAK, Cincinnati.

"Lead Poisoning in Industry as a Clinical Syndrome"—WILLIAM F. ASHE, M.D., Cincinnati.

PART II—General Surveys and Experimental Studies:

"A Study of the Health of Workers Exposed to Lead in the Manufacture of Storage Batteries"—W. C. DREESEN, M.D., Washington, D. C.

"Experimental Studies on Lead Absorption and Excretion in Human Subjects, and Their Relation to the Diagnosis and Treatment of Lead Poisoning"—A Summary and an Interpretation, ROBERT A. KEHOE, M.D., Cincinnati. General Discussion.

ANNUAL MEETING—American Industrial Hygiene Association:

"Radioactive Luminous Paint"—L. F. CURTISS, Washington, D. C.

"The Ventilation Requirements for Radium Dial Painting"—W. C. L. HEMEON, Boston; R. D. EVANS, BOSTON.

"High-Altitude Flying"—J. W. HEIM, Dayton, Ohio.

Wednesday Evening, April 15, 1942

ANNUAL DINNER—7:30.

Presentation of WILLIAM S. KNUDSEN AWARD.

Speaker to be announced.

Thursday, April 16, 1942

THE Metabolism of Nitroparaffins"—E. W. SCOTT, Cincinnati.

"The Absorption, Retention, and Excretion of Fluorides at Normal and Abnormal Levels of Intake"—WILLARD MACHLE, M.D., and E. J. LARGENT, Cincinnati.

"Vitamins and Solvent-Vapor Poisoning"—R. W. McKEE, Boston.

"Inhibitor Mechanisms Against the Action of Free Silica"—L. U. GARDNER, M.D.

"Ventilation and Dust Problems Associated with Deep Tunnel Operations in Colorado" (Moving Picture and Talk)—R. J. OWENS, Denver.

"The Casting of Magnesium"—C. R. WILLIAMS, Boston.

"Physiological Action of Metallic Magnesium"—S. F. MEEK, M.D., Detroit.

"Splinter Wounds from Light Metals"—R. Z. SCHULZ, M.D., Boston; C. W. WALTER, M.D., Boston.

"The Toxicity of Aluminum"—F. F. HEYROTH, M.D., and J. CHOLAK, Cincinnati.

"The Analysis of Atmospheric Samples of Explosive Chemicals"—F. H. GOLDMAN, Washington, D. C.

Friday, April 17, 1942

SOME Recent Observations in Phosphorus Toxicity"—R. B. L. FLEMING, and J. W. MILLER, Washington, D. C.

"The Clinical Effects of Industrial Exposure to Tellurium Fumes"—H. H. STEINBERG, M.D., Chicago.

"The Toxicity of Lead Chromate"—G. C. HARROLD, Detroit.

"Health Hazards in Steel Mills"—J. W. FEHNEL, New York.

"A Reliable Procedure for the Evaluation of Exposure to Lead by Spot Urine Sampling"—L. F. PEKRUL, Denver; R. C. LEWIS, Denver; D. E. CUMMINGS, Denver.

"The Determination of Fine Oxide Fumes in Air"—W. G. FREDRICK, Detroit.

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Volume 11 **MARCH, 1942** **Number 3**

For the Duration

UNDER the impetus of current demands, industrial physicians in charge of medical matters in many of the important operations necessary to prosecution of the war, are finding themselves in need of assistance. They are being compelled as never before in the history of industrial medicine to multiply their efforts. Most of them could be twins, triplets, and still not be able to get ahead, at any one moment, of the vast and increasing scope and detail of their responsibilities.

The help these physicians must have is, broadly speaking, of three kinds. The first is by way of additional staff members. This requirement has been thus far the one most easily met; but the demand—swift and imperative—has already practically exhausted the supply of men with experience, however limited, in industrial medical work.

The second lies in the increasing necessity for industrial physicians to "learn something of the type of hazards the workers must face." This compulsion has much less to do with the hazards of peacetime than with the sudden, new, unexpected and heretofore unmeasured hazards imposed by the exigencies of wartime.

Here is where the industrial physician must really multiply himself. He is doing this to a considerable extent in the one best way, which is through the aid of consultants. Hygiene departments and bureaus are busier than ever. And private consultants—of whom there are many with engineering and hygiene qualifications, and a lesser but sufficient number with all of these *plus* M.D. qualifications—are being increasingly called upon. This is as it should be in principle; it will still be as it should be when it is tremendously more common in practice. The consultants, even though they are busy, can do vastly more than they are doing. The industrial physicians should work these collaborative aids to the utmost—lest this emergency period prove a heydey for the ubiquitous lay groups who would like to be given the responsibility for the conservation of employee health and employee safety.

The third place of need is the continuing source of supply of new men. This, as is fully apparent from several features of this issue, depends on education. The A.A.I.P.& S. and the A.M.A. are now effectively cooperating toward the education of the younger men who are coming into industrial medical practice, to the end that, when they come, they will bring at least a modicum of knowledge concerning it. The principal dependency, however, for some time at least, must be upon the physicians in general practice, to whom will fall a great deal of the curative and an increasing portion of the preventive so far as employee health is concerned. "Every physician has, on this basis, an opportunity for instructive preventive medical achievement which no amount of personal distaste ought to impel him to ignore."

INCIDENTALLY, we cannot imagine why any general practitioner should find industrial medical work distasteful—except, perhaps, from the standpoint that he has had no experience with preventive medicine. Possibly, however, some echo of the past may linger; some remembrance of the general disrepute with which industrial medicine used to be regarded by organized medicine. That, of course, was in a bygone era; industrial medicine is now recognized authoritatively, and with a definiteness that makes up for lost time. Its recognition is complete and far-reaching; and the new attitude toward it, which is the precursor of a new knowledge about it, is indicated in the following, quoted here with sincere appreciation:*

"Here is another thing the individual physician can do. It may sound like a radical departure from custom. To some extent it is, but it will not offend the principles of ethics. He can study his own list of private patients, and, taking first those whose jobs he knows are important to defense, arrange to examine them, bring himself and his patients up to date on their current physical condition, and correct minor defects and ailments—now. The smaller industrial firms cannot maintain full-time or even part-time industrial physicians. Agriculture does not have them. So each private practitioner not otherwise fully occupied can elect himself a part-time industrial physician for his community for the duration. Each will know what to do, after a study of his own clientele. Consider one week's avoidable sick leave from even a small job that is important to our defense effort; consider one week's avoidable illness of the farm hand; yes, consider one week's avoidable illness of any citizen. Add these up for the whole country and it makes literally years of precious working time lost and possibly delays final victory."

It is not necessary to dilate upon what this would mean to the individual physician, to industrial medicine and its present needs, and to the nation.

*From an Editorial, *Rocky Mountain M.J.*, January, 1942, quoted in *Delaware State M.J.*, February, 1942.

BOOK REVIEWS

The Injured Back

THE INJURED BACK AND ITS TREATMENT. Edited by John D. Ellis, with seven contributing authors. Cloth, 377 pages, $5.50. Charles C. Thomas, Springfield, Illinois, 1940.

THE INJURED back has always been a special problem for the industrial physician and surgeon. In this volume Dr. Ellis and the contributing authors, H. Earle Conwell, Birmingham; Loyal Davis, Chicago; Nathan S. Davis, III, Chicago; Ralph K. Ghormley, Rochester; Hale A. Haven, Seattle; Professor Sir Arthur Keith, London; and Robert B. Osgood, Boston, have brought in nine especially selected chapters vital information to the industrial practitioner. These subjects include information on posture; backache; routine examination of the injured back; the management of recent compressed fractures of the vertebral bodies without cord injury; neurosurgical aspects of injuries to the back; the role of the articular facets in low pain; faulty body mechanics and back injuries; relation of trauma to certain inflammatory, degenerative diseases, and anomalies of the spine; and the treatment of minor injuries.

The authors have realized, as stated in the foreword, that the management of back injuries is not yet in the so-called textbook stage of standardization, but believe that the information in the volume will help to clarify the technique of some of the recently introduced diagnostic procedures, with the hope of establishing more definitely the indications for various modes of treatment.

Numerous illustrations, including diagrams, x-ray reproductions, and photographs of patients help to clarify the text and bring out important points. There are numerous references also listed at the end of each chapter, which is the individual production of each contributing editor.

The book represents an excellent, authoritative treatise, should have wide distribution among the general medical profession, and will add greatly to the library of the industrial physician and surgeon, who is forever confronted with the problem of the injured back and its treatment.

Fatigue of Workers

FATIGUE OF WORKERS—ITS RELATION TO INDUSTRIAL PRODUCTION. Committee on Work in Industry of the National Research Council. Cloth, 165 pages, $2.50. Reinhold Publishing Corporation, New York, 1941.

TODAY more than ever, this subject is of great importance to physicians and industrialists. The committee making this report was under the active guidance of Dr. L. J. Henderson, of the Fatigue Laboratory of Harvard University, and the report was written by George C. Homans, Secretary of the Committee.

The volume contains an introduction, hearings and deliberations of the committee, and general conclusions. In the report proper, there is consideration of heat and high altitude, some industrial causes of illness, the Western Electric researches, the interviewing method, self-expression, labor unions, extra-time allowances, a study of organization, and summary.

One of the most important conceptions of the book is its reference to and handling of the subject of "psychological" and "social" conditions of work. These conceptions are of practical use and of vital importance to the physician and the industrialist, and the reviewer looks upon them as not only very refreshing, what with all the pseudo-scientific material which has been written about fatigue, but also with the conviction that they should be of great practical assistance to the many supervisors (technical, safety, personnel, medical, and others) who must now deal with the problem of fatigue in industrial workers.

O. D. of the Skin

OCCUPATIONAL DISEASES OF THE SKIN. Louis Schwartz and Louis Tulipan. Cloth, 799 pages, $10.00. Lea & Febiger, Philadelphia, 1939.

WORKMEN'S COMPENSATION AND THE PHYSICIAN

By Henry H. Jordan, M.D.

191 Pages | 2 Illustrations | Cloth, $3.00

This manual is presented as a guide for the general practitioner and the insurance carrier in the handling of compensable injuries. It does not intend to compete with text books on the subject matter. Its chief aim is to illuminate those aspects and problems which, in the management of disabilities covered by workmen's compensation, differ from the familiar considerations in the treatment of non-compensable injuries and diseases. The subject matter is limited to general diagnostic and therapeutic problems, typical phases of the workmen's compensation procedure. This includes a discussion of questions such as the aggravation of pre-existing disease, the causal relation between injury and disability, and expert opinion and disability evaluation.

Industrial and railway surgeons may refer to the difficult problems of causal relation and of aggravation of pre-existing disease in the pertinent chapters.

The book is written in plain language and should be intelligible to the non-medical officials and employees of insurance companies, to lawyers, to industrial commissioners and referees of the labor departments who must decide compensation cases.

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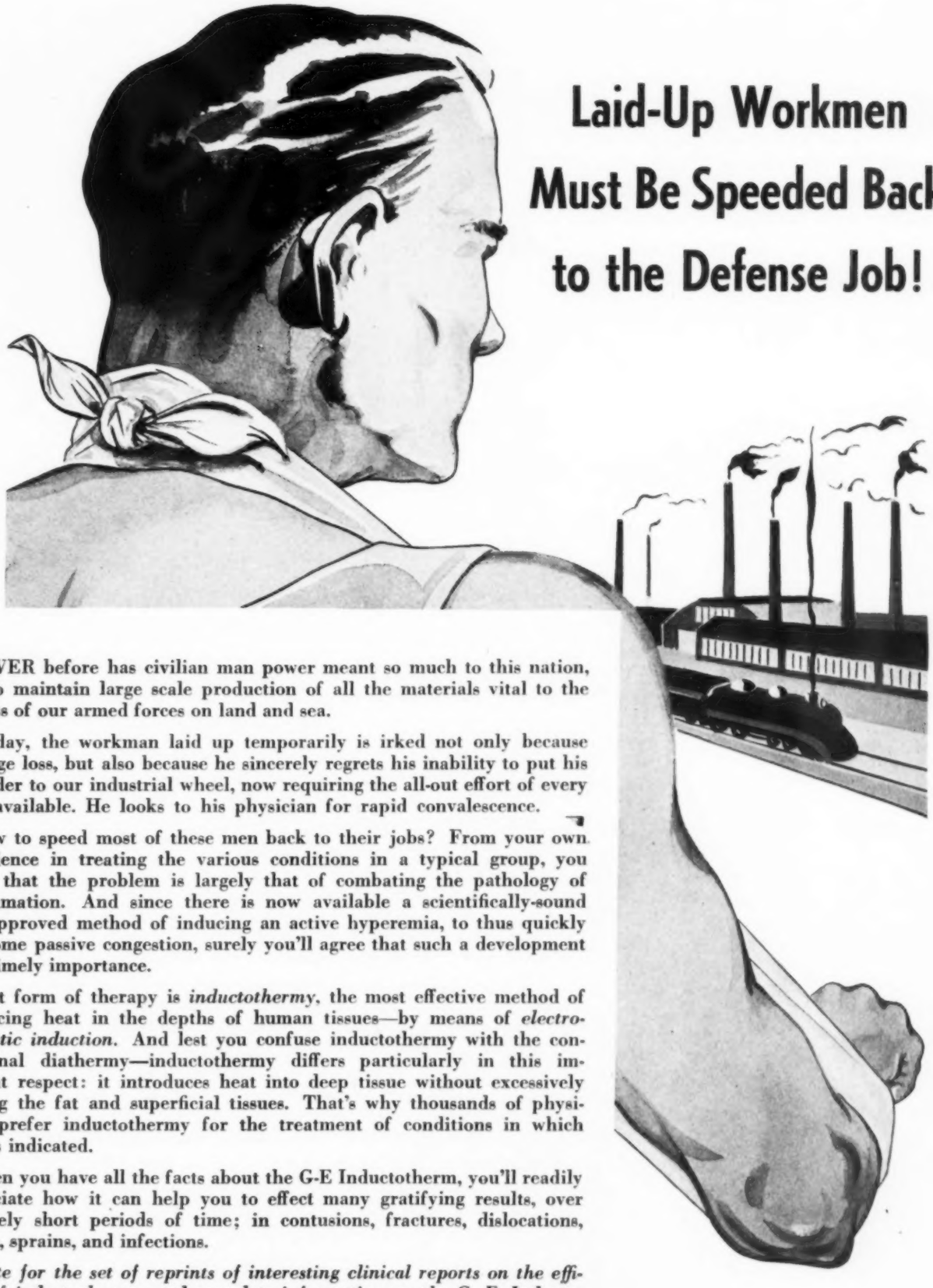

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ONE reason why this book is valuable to industrial physicians and surgeons is because from 60 to 70% of compensation cases in which there is alleged or causal relationship between employment and disease, are made up of skin affections. Another good reason is the fact that there are few manufacturing concerns in which there is not some type of occupational skin disease hazard.

Both of the authors have had considerable experience with the subject, Dr. Schwartz having been the medical director of the Office of Dermatoses for the U. S. Public Health Service for some period of time, and Dr. Tulipan having been clinical professor of dermatology and syphilology at New York University for many years.

The material is arranged in a very orderly fashion, taking up relationship of workmen's compensation laws, incidence of industrial skin disease, classifications, diagnosis, problem of borderline cases, general methods of treatment, and prevention, and methods of investigation. There then follow chapters giving information on dermatoses as caused by different kinds of agents, such as metals, acids, alkalies, tar products, cosmetics, and many others. There are also chapters on various industries, and including information regarding parasites, bacteria, cancer, infection, and diseases of the nails. Not the least of value is the analysis of skin hazards in 74 occupations, and a list of chemicals which are known to be, or which can be, skin irritants. The 116 photographic reproductions help in understanding the type of lesions produced. This is the first book of its kind in America, and one of the most important contributions to the literature of industrial health and industrial medicine.

Trauma and Disease

TRAUMA AND DISEASE. Edited by Leopold Brahdy and Samuel Kahn. Second edition, enlarged and revised. Octavo, 655 pages, illustrated. Cloth, $7.50. Lea & Febiger, Philadelphia.

TWENTY-FOUR contributors, with the editors, supplied the material for this volume, which is now in its second edition. Trauma is considered in relationship to the etiology of disease, heart disease, peripheral vascular disease, pulmonary tuberculosis, pulmonary diseases, diseases of the gastro-intestinal tract, genito-urinary disease, obstetrical and gynecological conditions, mental disorders, neurosyphilis, diseases of the nervous system, diseases of the bones and joints, diseases of the spine, neoplasms, diabetes, thyroid gland, and septicemia.

There is presented here the accumulated knowledge of the relationship of a single trauma to disease, excluding those conditions which are obviously caused by a single trauma (such as sprains, fractures, and lacerations). Definite facts are supplied, based on pathological, clinical and laboratory investigations, on which the physician must rely, rather than on information derived from court decisions.

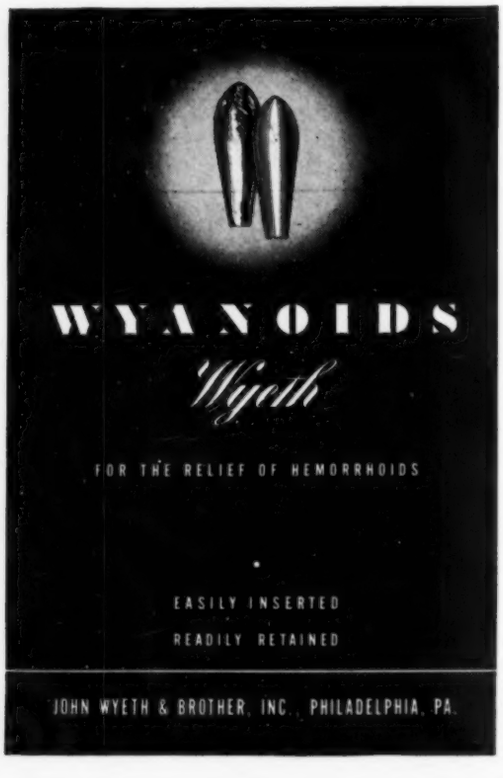
With the rise in accident rates, the increasing tempo of our war activities, the emphasis on compensation laws, and the growth of industrial medicine and surgery, here is a work which no traumatic surgeon can afford to overlook.

INDUSTRIAL HEALTH AND DISEASE

Impairment of Productivity

MANY things have apparently been found to impair and to improve productivity in factories when the work is moderate. This is true to such an extent that it appears as if almost anything that the management does that attracts the interest of the workers or indicates interest in their welfare improves productivity. This renders it difficult to interpret

From "The Physiology of Work," by A. C. IVY, M.D., given at the Fourth Annual Congress on Industrial Health, Chicago, January 12-14, 1942; published in *J.A.M.A.*, February 21, 1942.



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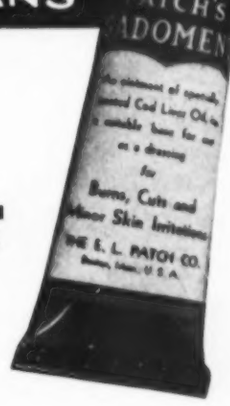

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the results. In many experiments performed to ascertain the effect of a new factor on output only "before and after" output was determined for a relatively short period of time. This is perhaps an adequate type of experiment from a utilitarian point of view, but it is not adequate to determine the specificity of the factor introduced.

Recently it was clearly demonstrated that the output of a group of workers in a shoe factory who ate the ordinary three meals a day was materially increased by providing a forenoon and an afternoon lunch of a glass of milk and a piece of cake. The lunches prevented the usual decrement in production in the latter half of the morning and afternoon. It was concluded that the decrement in output was not due to the work performed but to the operator's need of food. However, one wonders what would have happened to output if the operators had received a bottle of flavored charged water sweetened with saccharin and cellulose cookies flavored with spices and saccharin. Was the improvement in output due to food or was it due to the improvement in the feeling tone that follows ingestion of something appetizing? Or, was it due to the fact that the workers were given something?

The results of the researches conducted in the Western Electric factory in Chicago are of interest in relation to the effect of working conditions on output. The observations were made during a period of five years on five women operators experienced in assembling relays. It was found that seasonal environmental changes in temperature and humidity, various types of rest periods, shortening the working day by one-half hour or an hour, the five-day work week or a morning lunch, free or brought from home, did not significantly affect the hourly output record. It is to be noted that no extremes in working conditions were tested. The only significant finding was that the output steadily increased during the period of the experiment. As a control, when, with the operators' consent, a return was made to the original conditions of work, with no rest pauses, no special lunches and a full length working week, the daily and weekly output rose to a higher point than ever before. The changes observed could be accounted for only on the basis of psychologic or sociological factors. A study of the effect of intensity of illumination was also made on a large group of operators. It was found that when the light was increased the output increased, because the workers believed that they were expected to produce more, and when the light was decreased the output decreased for the same reason. When a mock change in light bulbs was made, the workers commented favorably on the imagined increase in illumination and produced more.

Those with experience in the field of work know that so-called sociological and psychologic factors cannot be eliminated from any type of work performed by man.

SOME of the more important observations made by the British during the first world war and in this war may be summarized as follows:

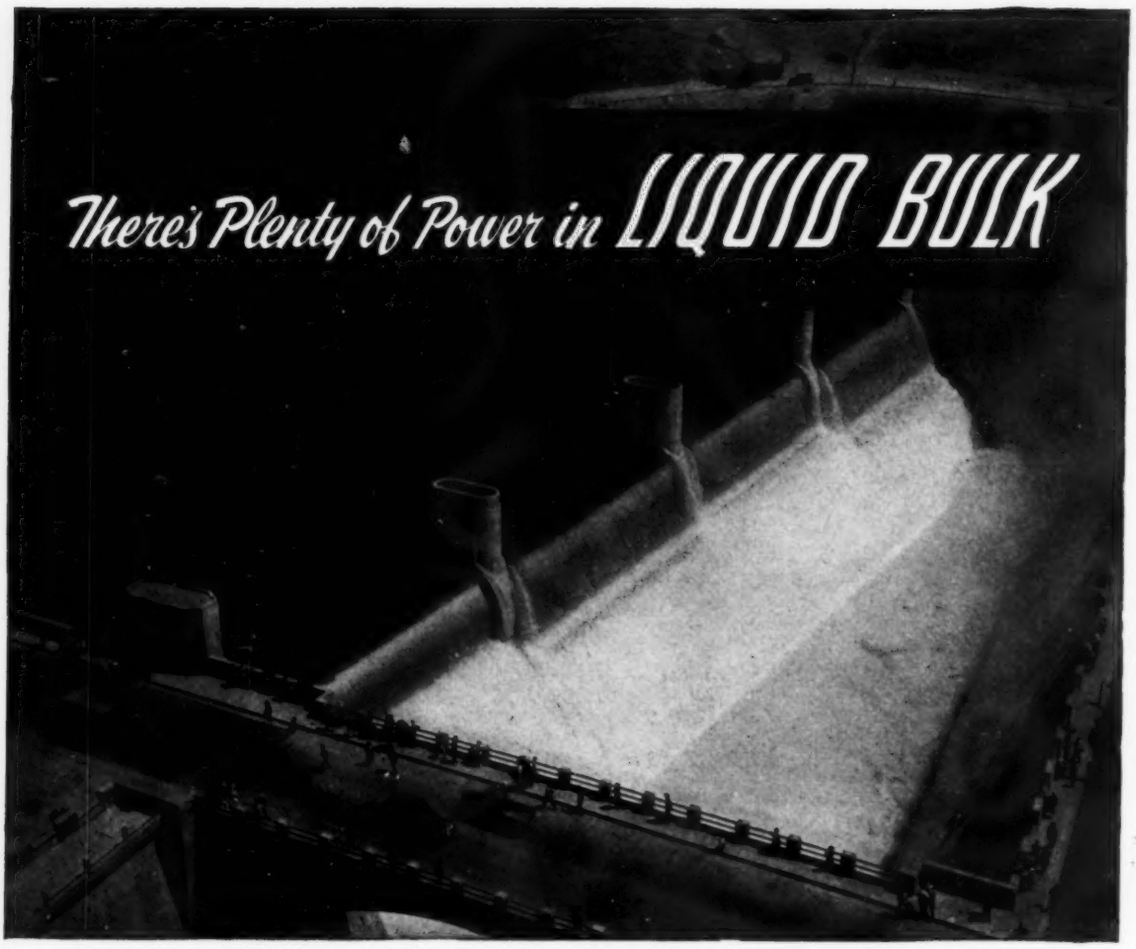
1. An extension of the usual hours, except for a short period, does not yield a proportional increase in output.

2. After an extended period of overtime has been discontinued, weeks are required before the original steady output is attained.

3. More than 60 hours a week leads to increased lost time during work, increased absenteeism and sickness. One day's rest in seven is essential. British experience has shown 56 hours a week to be the optimum standard for men.

4. Organized or enforced rest periods, particularly with an opportunity to take food during the period, assist in the maintenance of a high output level.

It is of interest that the original investigations of the British health board were undertaken because of the increase in illness among munitions workers in the last war. The same observations have been made under conditions of overtime in the present war. For example, among women the loss of time due to illness during a 62 hour week was twice that of a 44 hour week. For men the same was true for a 64 hour week versus a 54



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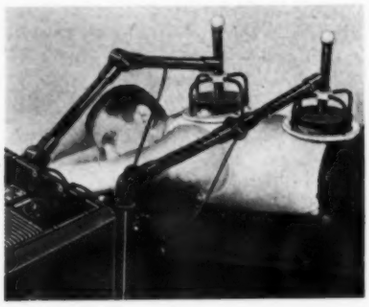

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[1]Fishor, J. C.—Journal Lancet—March 1942

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hour week. The overtime workers have usually complained of headaches, pains in the back, legs and feet, indigestion, palpitation and insomnia, and the consumption of alcoholic liquors among them has been observed to have increased considerably. The relation of overtime to accidents is not so decisively demonstrated. However, in one survey of 50,000 accidents occurring in four factories, the 12-hour day was associated with three times more accidents than during a 10-hour day among women. A similar proportional excess was not observed for men.

Industrial Doctors' Exchange

Suggestions by
JAMES H. BIRAM, M.D.,
Medical Director, Colt's Patent Fire Arms Manufacturing Company

—*From* Connecticut Industry, *official magazine of the Manufacturers' Association of Connecticut, Inc., February, 1942, introduced as follows: "This column, sponsored by the Association's Health and Safety Committee, will seek to promote an exchange of ideas between industrial doctors in the hope that they will be helpful in furthering the adoption by Connecticut industries of improved healing procedures.* Connecticut Industry *welcomes suggestions and comments from all industrial physicians."*—

AT COLT'S we have been experimenting since last July with a sulfathiazole dusting powder on burns, in combination with a new surface anesthesia, which we have been testing for one of the large pharmaceutical houses and which we hope will soon be on the market.

We remove blisters and dead tissue with scissors. If fairly extensive, we do this under warm water; then we dust with sulfathiazole powder by means of a blower and apply a layer of this surface anesthesia on gauze over the burn. In a minute or less all pain has disappeared and the individual returns to work. The same procedure is followed the next day. We have found that there is no discharge from the burn, no redness around it, and no dirty slough over it. The burn heals without a scar in about one-third the expected time.

We have used this treatment in well over 200 cases, varying in severity from second-degree burns of both hands and entire forearms and one-half the surface of leg and foot below the knee to small areas with considerable destruction of tissue. We have had no irritation from the sulfathiazole powder or the anesthetic ointment. Only one man lost time (five days). This was a case involving the lower leg and entire dorsum of foot and toes.

We have been dusting sulfathiazole powder in and on all our abrasions, cuts, and wounds since last March in varying amounts, from a simple dusting on abrasions to an entire 2 oz. bottle in some large major lacerations of the hand and forearm.

We dust all our redressings, and feel that this is a valuable aid in the reduction of infections. In well over 100,000 of these treatments we have had no unfavorable reactions and no skin irritation.

We do find some skin irritations in our use of sulfathiazole ointment. Sulfadiazine has been tried as a dusting powder but we did not obtain any improved results from its use. We have also tried sodium sulfathiazole but it did not dust as well and the men complained of it burning.

The Medical Director of a neighboring plant does not entirely agree with my conclusions. We would like to have expressions of opinion from other industrial men as to their experiences. We do not have the time to write long scientific papers, but our experiences and results might be very helpful to each other.

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The Industrial Front in Germany

—From a review of working conditions and social welfare in Germany since the war, by T. Prager and M. J. Wilkinson, in Labour Management *(London), January, 1942. The article is exhaustive and carefully annotated. The material is based, in the main, on German publications—*

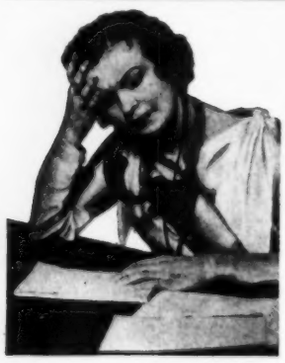
THE demands of industrial mobilization during the war have raised many new problems of social welfare in the factories. These problems have been particularly acute in this country, where the adjustments to war conditions have been sudden, but they have also arisen in an urgent form in Germany, where industry was put on a semi-war footing even before the war started. It would seem useful, therefore, to consider briefly how German social policy has attempted to meet the new problems of social adjustment on the "industrial front." It is not proposed to deal with the more general problems of man-power policy such as the relative merits of labor conscription or of a more or less voluntary system of industrial recruitment (nor with such points as the "dual purpose army" or the employment of foreign labor and prisoners of war). . . .

Health

ACCIDENTS. The shifting of workers from one working place to another and from one type of work to another, the employment of unskilled female labor and the strain due to overtime have all resulted in an increase in the rate of accidents. Unsatisfactory lighting arrangements due to the black-out, the postponement of the replacing of worn materials (such as ropes on lifts, pit props, etc.) and the use of new substitute materials (such as magnesium and its alloys), which are often handled in an inexpert way, have all further contributed to this result. Figures are not generally given except for one inquiry into several thousands of accidents in a group of undertakings which showed how the liability to accidents is reduced with increasing length of service. "Of the workers in these undertakings 17.5% had been employed for one year or less; 13.5% for two years; and 27% for three to five years. The first of these groups accounted for 38.5% of all accidents, the second and third 20.8 and 23.8% respectively." The experience during the last war is also held up as a warning. Accidents between 1913 and 1918 increased by 15% (which seems surprisingly low), while fatal accidents increased by 60% during the same period. Employers are warned to pay more attention to the installation and maintenance of protective devices, and specific recommendations concerning these things are made in large numbers.

VENTILATION AND LIGHTING. The adverse effects of the black-out are discussed in relation to the health of the workers, and many specific recommendations are made to employers, who are also asked to invite and reward suitable recommendations from the workers. As regards ventilation, all factories in which there are poisonous fumes and dusts are, of course, to provide the necessary devices. But this is also to apply to workshops in which there are non-poisonous fumes or great heat. Mechanical ventilation such as fans, or shafts, or wooden blinds fixed at some distance from open windows, or indirect ventilation through the roofs, etc., are suggested. As regards lighting, it is pointed out that care should be taken to avoid strong contrasting effects which would tire the eyes and cause headaches; thus a good black-out and overhead lighting is to be preferred to shaded desk lamps or lamps over machines which force continual adjustment of the eyes as soon as the worker looks up.

MEDICAL RESEARCH AND INDUSTRIAL PSYCHOLOGY. "One feature of social policy is an extensive medical service in the factories. In all important factories workers are being regularly examined to prevent a falling off in efficiency. Doctors trained in industrial psychology are also being called



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in to advise managers as well as workers on suitable transfers to jobs vital for the war economy." A great deal of special research is going on at the Kaiser Wilhelm Institute for Industrial Psychology in Dortmund; the problems studied include suitable nutrition for the workers, the most appropriate shape of tools, the correct way of handling machines, the optimum speed of the conveyor-belt, rational division of labor, the question of rest pauses, etc.

VARIOUS OTHER HEALTH PROBLEMS. The importance of protective clothing is stressed for all workers working in conditions of great heat, cold or damp, and for those engaged in poisonous trades. There are to be no restrictions on the textile industry for this particular purpose. Soap and other cleaning materials are distributed with special regard to the needs of factory workers, miners, etc. The importance of adequate rest facilities such as chairs and benches is stressed in connection with the employment of women and new workers not used to long periods of standing. In this connection furniture factories are to be specially considered in the allocation of timber and iron. Finally, mention may be made of the various institutions which exist for the workers' health (and which were, of course, established for the most part long before the Nazis came into power). This is admitted in the following statement: "In all these respects things have always been much better in German industry than in most other countries." Thus it is pointed out that in the Ruhr district alone there are no less than 60 sun-ray clinics, 22 swimming pools (visited, in 1937, by 100,000 workers), 150 milk distributing centres (selling, in 1937, almost one million gallons of milk), 35 rest homes for children, 11 rest homes for women, 80 kindergartens, over 100 playing centres for children, many domestic science schools, libraries, etc. In 1937 about 130,000 persons consulted the works medical advisory centres, which also visited over 70,000 homes, and caused about 14,000 children and juveniles to be medically examined. In that year there were about 500 full-time employees in all these services.

Traveling

THE drawing into the armament industries of workers living a long way off the factories and the difficulties of using bicycles in the black-out have prompted the larger undertakings to introduce "a comprehensive system of staggering hours of work over a period of two and a half hours, which has resulted in a more even distribution of the public transportation facilities." Further, the gratis transportation of workers to and from their factories in lorries belonging to the works has been encouraged by freeing them from the transportation tax for this purpose.

Women in Industry

THE official Labor Gazette estimates the increase of women workers for 1939 and 1940 at 12.6% for the old Reich. The actual increase for Greater Germany may thus be put at well over one million." Actually most of this increase fell into the months prior to the outbreak of war, the increase since then constituting only about 300,000. This means that about 38% of the total labor force (excluding prisoners of war) in greater Germany now consists of women. The increase from 1939 onwards cannot be explained in terms of compulsion alone. It is true that (apart from direct conscription which has only been sparingly applied) there is a "background of fear (which) is strongly underlined by almost perfect coordination in the unfavorable treatment of persons trying to put an individualistic spoke in the collective machine of man-power disposition. A woman, for example, refusing to take up the type of war work allocated to her would find the consequences of such refusal reflected in her dealings with the shopkeepers, food officers, winter help officials, license authorities, and possibly in her husband's earnings." But there is also "minute anticipation" of the difficulties of married women entering war work which "plays a large part in brushing aside the individual's attempts at resistance by providing (through organization) . . . a ready-made answer to any

objection that may be raised." The importance of such measures, particularly with regard to the employment of married women with young children, can be judged from the fact that the increase in the number of women employed in 1939-40 was mainly due to an increased employment of the older age groups. The employment of women under 25 was only increased by 7% in that period, and that of women between 25 and 34 by 4.2%. "There was hardly any extra labor to be found in the younger age groups, and those from 25 to 34 were hampered by the care for young children."

THE CARE OF YOUNG CHILDREN BY THE STATE. "Even before the war the National Socialist Welfare Organization provided 1,500 nursery schools where about 500,000 children, mainly under school age, were looked after. The number of children in the individual nurseries varied between 30 and 40. In many cases they were provided with meals, the mothers having to contribute no more than a small sum of money, or nothing at all in case of need." It is stressed that the provision of creches by individual firms is of paramount importance.

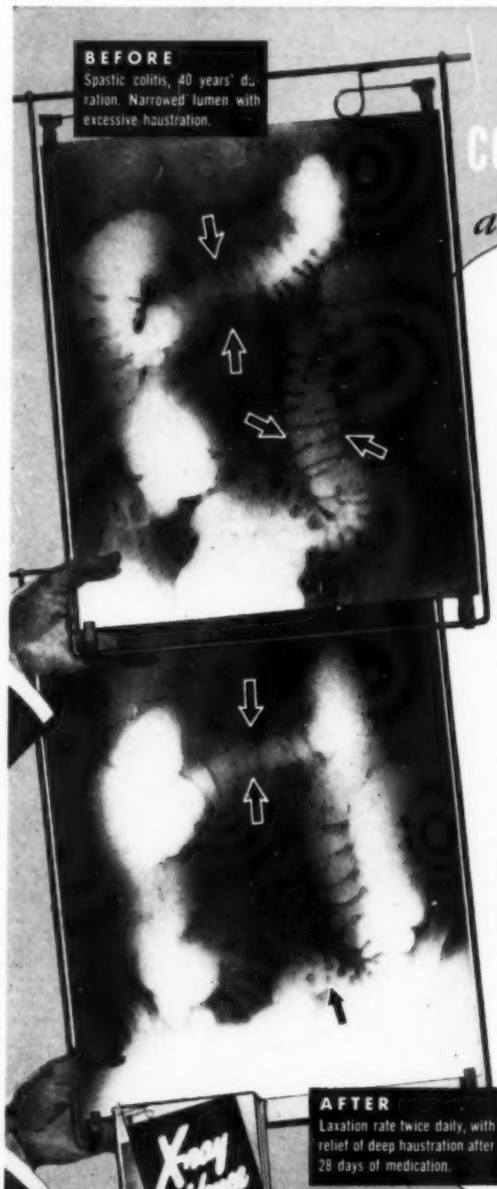
SHOPPING, LAUNDRYING, MENDING. With regard to the various household duties, it was proposed to meet the difficulties of married women by giving them one free day per week (say Saturday). But it soon turned out that one fixed day would not do; "women cannot always have the use of the washing room for their laundering, or the office where they are to fetch their ration cards is not open on their free day." So now women can have one day off in two weeks, taken at their own choice, after due notification to the employer. Also the shift system is adjusted to these problems, after the "experiments in autumn '39 failed when women were temporarily required to work on night shifts." Absenteeism on some days was as high as 50—80% in the case of married women, largely because the strain of night work was too much for them, in addition to the buying of food, etc. So now double shifts have been adopted in which the hours are from 6 A.M. till early afternoon one week, and in the following week for the same women from noon till 11 P.M. In certain districts women war workers can do their shopping at reserved hours. Apart from this there is also a system by which the German Women Service arranges for the women neighbors of women war workers to do their shopping for them, look after their households, their children, etc. "Mending communities have been arranged in a similar way." Further, there are arrangements for communal shopping, laundrying, etc., at many factories.

SELECTION OF OCCUPATIONS FOR WOMEN WORKERS AND GENERAL PROBLEMS OF EFFICIENCY. While there is a tendency for women in increasing numbers to take the place of men in industry (a process which must have been greatly speeded up since the German-Russian war) employers are warned not to put women on jobs where their energies would be consumed at a rate detrimental to their health. Thus women are not to be employed on jobs where heavy lifting and carrying is required. "The limit for lifting and carrying is generally fixed at 15 kilogrammes. If tools must be used continually in the job, their weight should be examined and taken into account in connection with the employment of women on such jobs. A drill gauge, for example, which has to be lifted 1,000—1,500 times a day by a woman in a seated position should weigh less than 5 kilogrammes." Doctors and construction and management engineers are called in to give advice on this matter. They "help to make it possible for newly-trained female workers to perform operations previously entrusted to skilled male workers. Methods of work were changed, or a subdivision of operations was introduced after job analyses. In some instances, additional devices were added to the normal working machines, or the machines were reconstructed, or special machines or tools were manufactured for the use of women workers." They also draw attention to the need of making the best of existing capacities and skill: thus it used to be said that women should not be employed in foundries at all, but it was found that women were excellent in coremaking, "which is an essential part of foundry work . . . . subject to limits with respect to the weight of the cores": for women, because of their smaller hands and finer sensitivity in their finger tips, are often well adapted for the making of the finer and more complicated cores.

Often women were employed in the right place, but working hours were too long. "The decline in productivity often went so far that hardly any more was produced in two shifts of 10 hours each than in two shifts of eight hours each, and, conversely, that hardly anything was gained by an increase in the working day from eight to 10 hours." So the working day was shortened; night work was, in general, abolished for women, and the system of two shifts of 10 hours each was replaced by the system of three shifts of eight hours each. For women with heavy household duties half-day shifts have also been introduced where they work from four to six hours a day; this has proved easier in office work and in the case of unskilled jobs, and less easy in the case of highly mechanized processes such as the conveyor belt system, etc. It is pointed out, however, that there are communication difficulties in the rural areas, and that this device involves high overhead costs on the social and administrative side. "In order to avoid having full-time workers engage in part-time work, the employment offices engage as part-time workers only women who have so far not had a profession or who have not been employed for a long time." But to the latter all kinds of encouragements are given such as holidays with full-time pay, the aim being to make half-day work "a pleasant change from household drudgery."

FACTORY WELFARE OFFICERS. During the last war factory welfare was largely confined to charity and to making good, "in a passive way," whatever damage had already been done to the health of the women workers. This is not considered enough now, and a system of Factory Women Wardens and of Factory Welfare Workers has accordingly been introduced by the German Labor Front. The responsibilities of the two types of welfare workers are not clearly distinguished, nor is it clear whether they do, or do not, work side by side in the same factory. Both are to advise women on their legal rights such as holidays and insurance and on health questions which, in cooperation with the factory managers, are to be balanced against the technical requirements of the job: thus they must see to it that unnecessarily heavy lifting and carrying, too great speed of work, bad lighting, etc., is avoided. They are also to try to stop quarrels and jealousies among the women workers, and to overcome any friction that might arise as between them and their foremen and overseers. They should help to establish works creches, works laundries and canteens, etc., and generally to call forth increased efficiency and "increased will to work." Welfare workers are selected on the basis of their experience of social work, but are also put through courses organized by the German Labor Front. Clearly, the initiative in the whole question of welfare officers is not left to the private employers.

WAGES OF WOMEN WORKERS. An interesting problem has arisen relating to the wages of women in industry. A great number of women have taken over jobs hitherto exclusively done by men, and those women want the wages formerly paid to men. Before the war women were paid generally from 10—40% less than men, that is to say, in industries where women were traditionally employed. The labor authorities argue that to pay women newly employed in war industries the same wages as men would completely upset their system of controlled wages. The suggestion is to pay these women 25% less than men. At the same time, the Price Commissar is advised to increase his control over employers who will benefit from the lower wages paid to women. There are a great many cases where women workers get the family allowances, on account of their husbands being conscripted, on top of their wages, and the allowances paid to married women employed in industry are to be reduced generally to one-third, though more may be paid according to actual wages earned." Recently it was announced that women are to receive, in general, the same piece rates as men under the same work conditions.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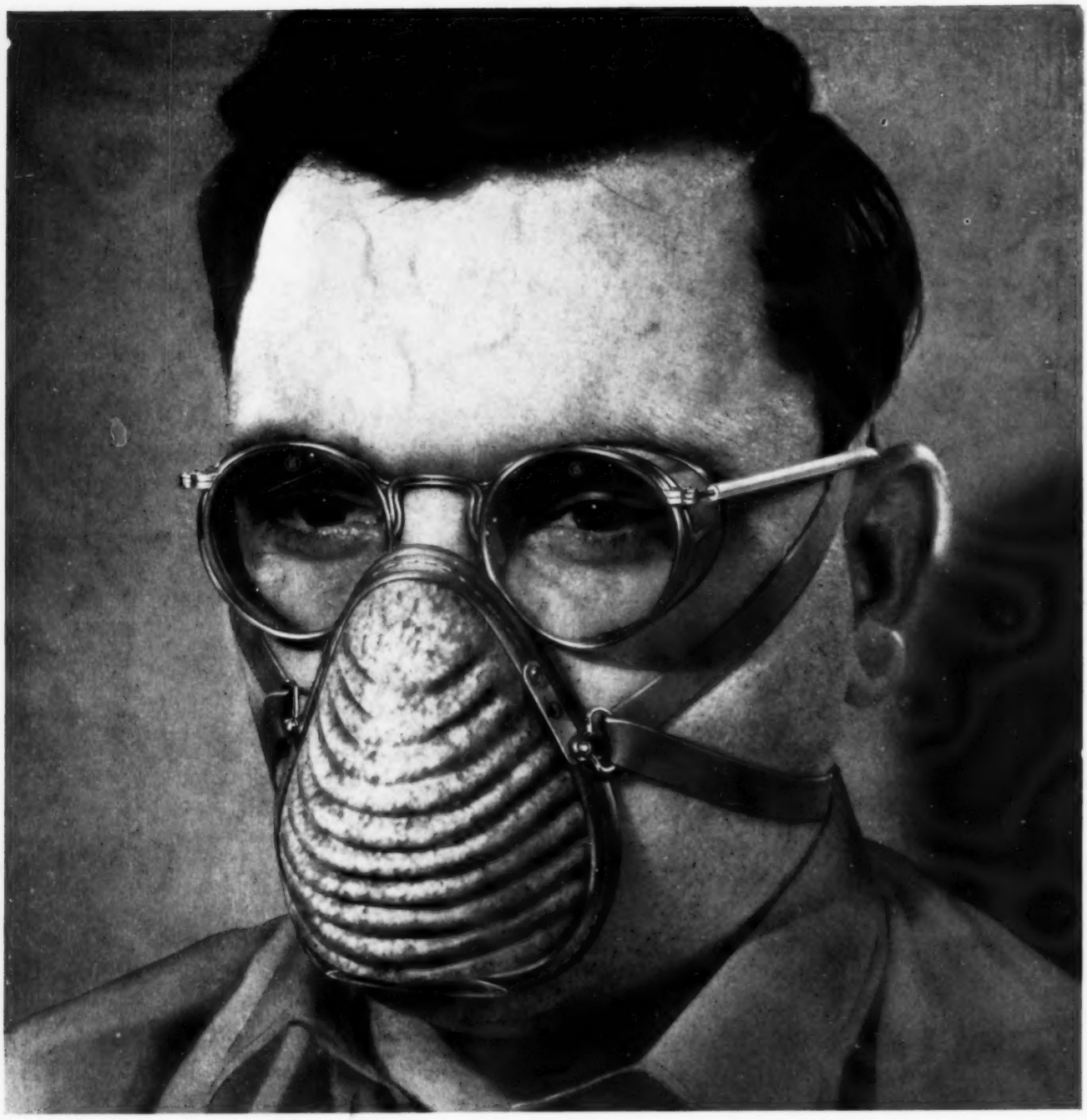

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